

THE IRON AGE

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Reading Matter Contents.....page 886
Alphabetical Index to Advertisers " 193
Classified List of Advertisers " 183
Advertising and Subscription Rates " 192

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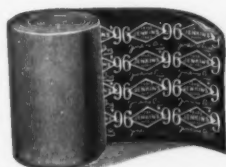
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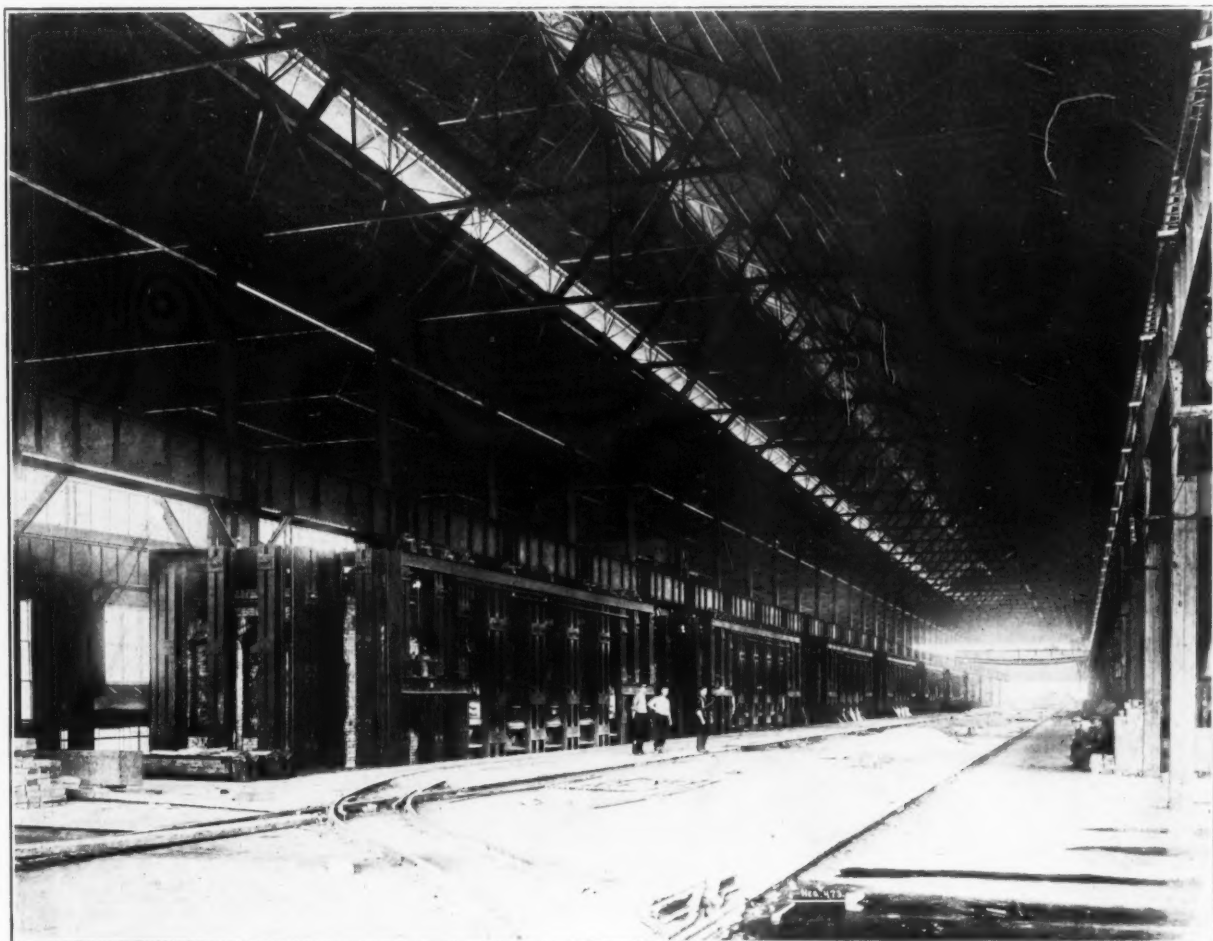
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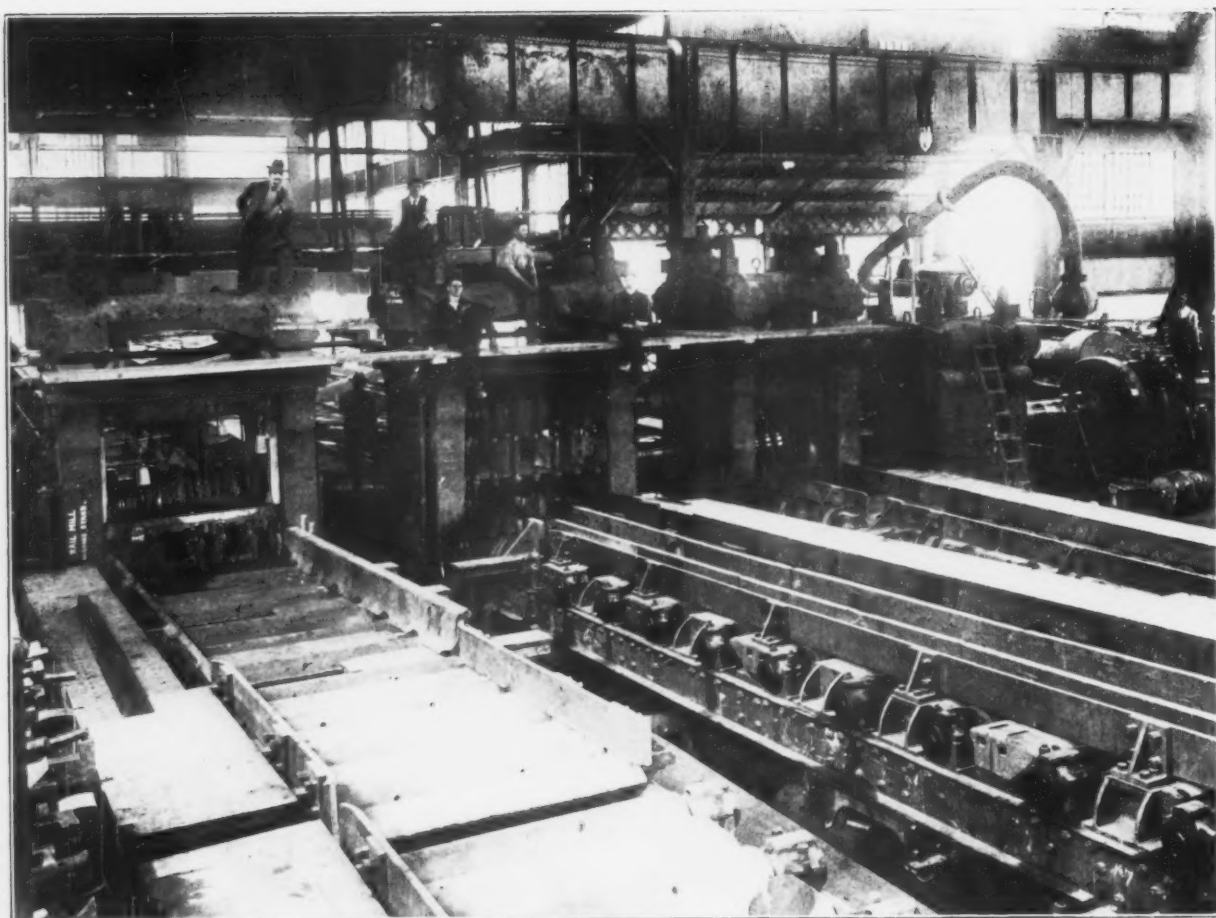


POURING SIDE OF THE OPEN HEARTH FURNACES.

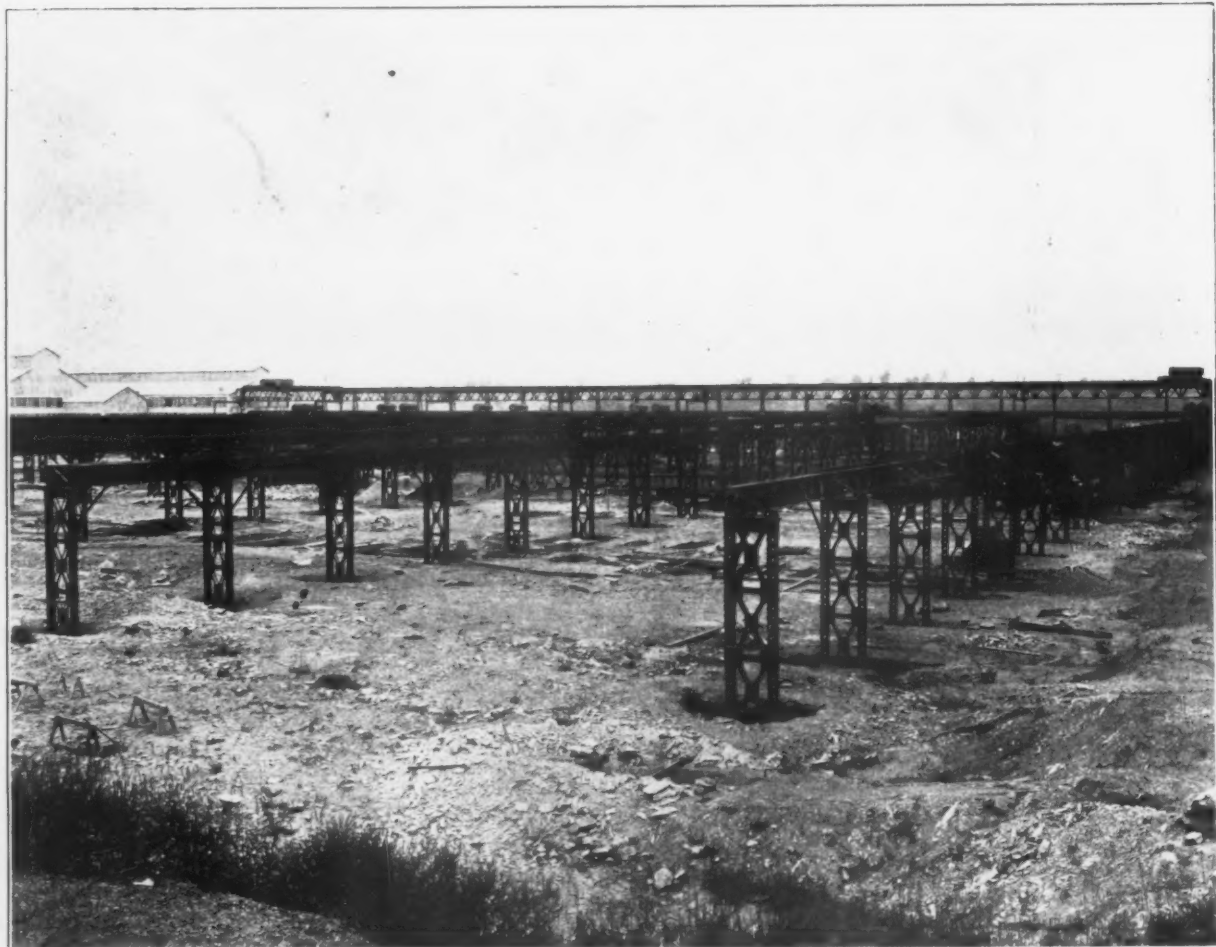


CHARGING SIDE OF THE OPEN HEARTH FURNACES.

THE NEW SAUCON PLANT OF THE BETHLEHEM STEEL COMPANY,
SOUTH BETHLEHEM, PA.



ROUGHING, INTERMEDIATE AND FINISHING STANDS OF THE 28-INCH RAIL MILL.

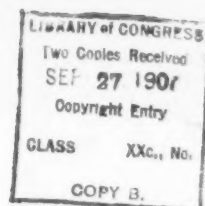


THE SHIPPING AND STORAGE YARDS.

THE NEW SAUCON PLANT OF THE BETHLEHEM STEEL COMPANY.

THE IRON AGE

New York, Thursday, September 26, 1907.



The Bethlehem Steel Company's New Plant.

A Description of the 28-in. Rail Mill and the 28-in. Structural Mill at South Bethlehem, Pa.

In *The Iron Age* of November 1, 1906, an outline was given of the improvements planned by the Bethlehem Steel Company at its Saucon plant, South Bethlehem, Pa., involving, together with blast furnace erection at the old plant, the provision of new ore handling equipment and other important additions, an expenditure of about \$12,000,000. The new plant is now in partial operation, the rail mill having started recently and five of the 10 open hearth furnaces. The original plans called for basic open hearth furnaces, blooming mills, rail mill and structural mills. These were to be in a group about 1 mile east of the blast furnaces of the company. The starting of the rail mill will be followed next month by the beginning of operations with the 48-in. Grey universal beam mill, and a third unit, a 28-in. structural mill, will start early in 1908. The present article deals chiefly with the rail mill and the 28-in. structural mill, with some reference also to the open hearth plant and the 40-in. blooming mill. Besides there is under erection a 46-in. blooming mill, which will serve the Grey universal mill.

With the building of its new Saucon plant the Bethlehem Steel Company returns to the manufacture of rails, which was carried on at the old plant for about 25 years, though no rails have been rolled since the late nineties. The structural mills represent the first operations of the company in the manufacture of steel shapes, though for a number of years under the old *régime* it was a manufacturer of plates. Formerly Bessemer steel rails were rolled at South Bethlehem. The output of the new rail mill will be low phosphorus open hearth rails. Besides the company will pay special attention to the production of nickel, nickel chrome, vanadium and other special alloy steel rails.

The Open Hearth Furnaces.

The original plans for the new Saucon open hearth plant called for two units, each composed of 12 50-ton furnaces. Thus far, as shown in plan view, Fig. 1, 10 furnaces have been erected. This number will be filled out by the addition of two furnaces when increased capacity is demanded, and later the 12 furnaces of the second unit will be erected. The open hearth building is 158 x 891 ft. As appears in the views given in the accompanying supplement, the layout is on a liberal scale, both in ground and air space. Sixty ft. clearance was allowed on the pouring, or pit side and 70 ft. on the charging side. Two 60-ton electric ladle cranes will handle hot metal over the charging floor. A 250-ton hot metal mixer is now being installed at the west end of the building and directly in line with the furnaces. The mixer will be supplied with metal from the blast furnaces by 35-ton ladle cars. For the charging of scrap or cold pig iron into the open hearth furnaces two Morgan low type electric charging machines are provided, built by the Morgan Engineering Company, Alliance, Ohio. On the pouring floor 70-ton ladles are used, and are handled by three 100-ton ladle cranes built by the Alliance Machine Company, Alliance, Ohio. The provision of an electric hoist for each furnace to handle the spout is a feature. Gas for the open hearth furnaces is supplied by 45 Laughlin gas producers, 10 ft. 3 in. in diameter by 14 ft. high, with 13½-in. lining. The gas producer building is 23 x 844 ft. These producers and the 20 supplying the soaking pits of the finishing mills are equipped with Heyl & Patterson overhead coal bins and coal conveying and ash handling apparatus. The company experimented with its gas producers, operating some of the open hearth furnaces with gas from four producers and

others with gas from five producers. It has been decided that the latter plan is the more economical in fuel, as the producers need to be forced where only four serve a furnace.

The scrap storage yard, 900 ft. long and 84 ft. wide, is south of the producer house and is commanded by three 10-ton electric cranes. When the plans are fully carried out by the erection of the 14 additional open hearth furnaces, two additional parallel scrap storage yards will be provided. The ingot mold storage space is to the north of the open hearth building, and between it and the boiler house. It is traversed by narrow gauge tracks, and overhead is an electric crane of ample capacity for handling all sizes of ingots and ingot molds. The ingots are taken over 3-ft. gauge tracks from the pouring pit of the open hearth building to the stripper building, which, as the plan view shows, is at the head of the buildings containing the two blooming mills and the rail and structural mills. The ingots are stripped of the molds by a crane of 100 tons capacity and are taken to the pit furnace building, containing six four-hole soaking pits, three on each side of the narrow gauge ingot track. The soaking pits are served by two 10-ton electric cranes, a 5-ton electric crane traversing the runway over the gas valves. Electric buggies convey the ingots to the blooming mill tables.

The 40-inch Blooming Mill.

In the article of November 1, 1906, the general facts concerning the blooming mills and the rail, standard structural and Grey universal mills were given. Before passing to the description of the rail mill some additional details may be given of the 40-in. blooming mill and its equipment. This mill serves the 28-in. rail mill and the 28-in. structural mill. It was built complete by the Mesta Machine Company, Pittsburgh, Pa., the installation consisting of approach tables, runout tables, an 800-ton hydraulic bloom shear and a three-cylinder hydraulic billet shear, with shear tables, shear delivery and weighing tables complete with loader and pushoff, together with scrap handling devices. The Mesta Machine Company also furnished the accumulators and intensifiers required for the equipment of this mill. The blooming mill housings weigh 105,000 lb. each.

The 40-in. blooming mill, of which a general plan is given in Fig. 2, is driven by a horizontal twin tandem compound geared reversing engine, built by the William Tod Company, Youngstown, Ohio. The cylinders are 40 and 66 in. in diameter, and the stroke 54 in. Both cylinders are separately attached to the bed plate, so as to allow free expansion. All valves are of tubular form, to relieve the unbalanced pressure of exhaust. The low pressure cylinders are fitted with twin valves. The links are so supported as to balance and are controlled by a floating gear connected to the pulpit, the operator being thus able to place them in a position to give an early cut off and maintain steam expansion. The engine is fitted with three throttle valves operated by a common floating steam gear. There is also a device for automatically maintaining steam pressure in the receiver between the cylinders when the engine is not in operation. All shafts are of nickel steel. The jack shaft is equipped with crabs on both ends.

The Manipulator.

The blooming mill tables are commanded overhead by a 10-ton crane on the approach side and by a 25-ton crane on the finishing side. A modified Wellman-Ken-

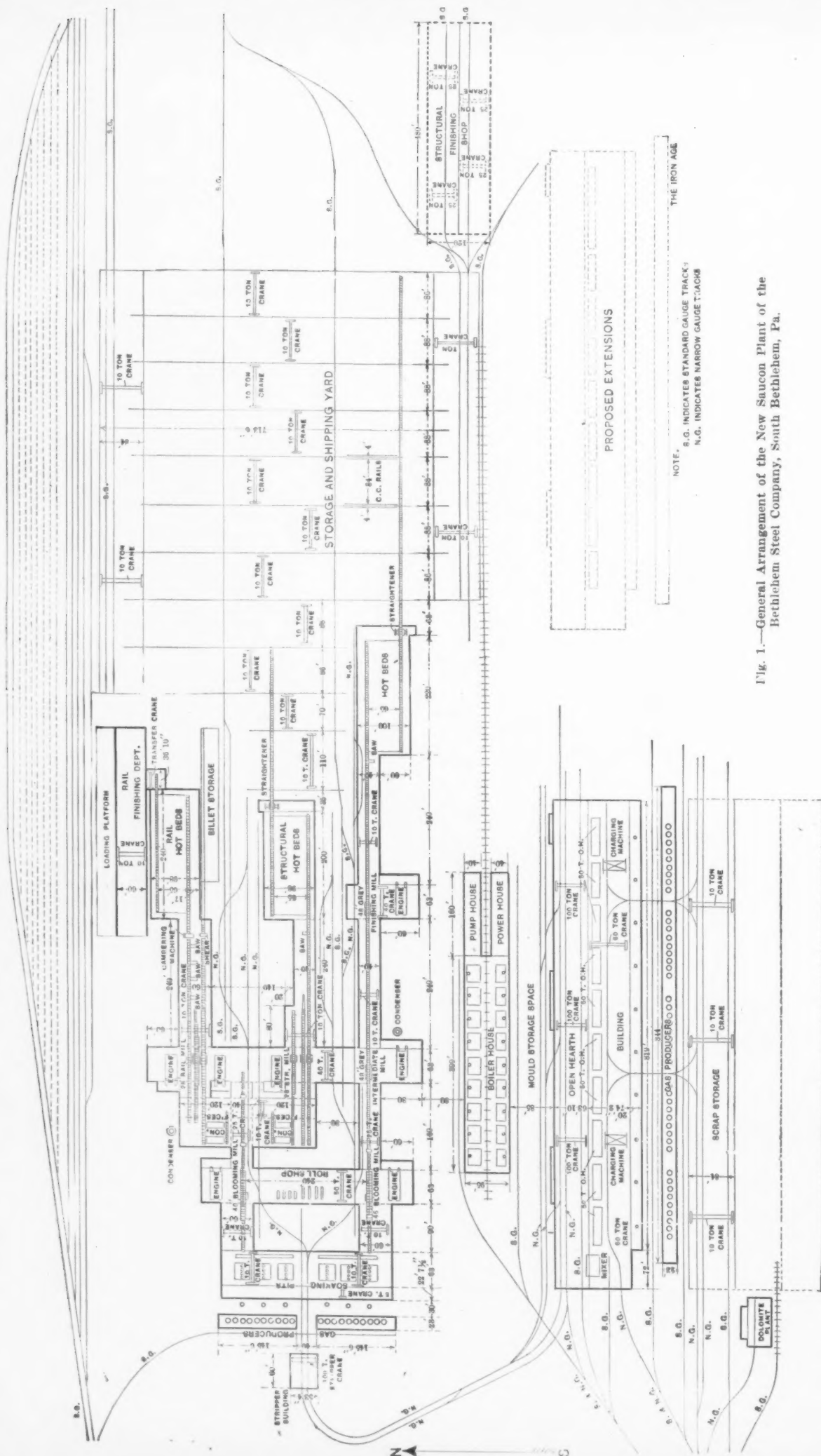


Fig. 1.—General Arrangement of the New Saucon Plant of the Bethlehem Steel Company, South Bethlehem, Pa.

nedy manipulator is provided. The two pusher bars on each side of the mill are $2\frac{1}{2}$ ft. high and 24 ft. long. They are steel castings, carrying on their faces heavy steel wearing plates. The mechanism, located underneath and at the side of the tables and actuating the pusher bars, consists of transverse racks working in opposite directions, which derive their motion from two pairs of hydraulic cylinders on each side of the mill. The manipulators on the approach and finishing sides of

The 800-Ton Shear.

The blooming mill is equipped with an 800-ton shear, after a new design proposed by Henry Grey & Son, New York, and built by the Mesta Machine Company. With its intensifier it is shown in elevation in Fig. 3. It has a stroke of 18 in., and the width of the knife holder is 5 ft. The shear is of the up-cut type and has one operating cylinder fitted with a plunger of 40 in. diameter. The line pressure of 500 lb. may be used or 1500 lb. pres-

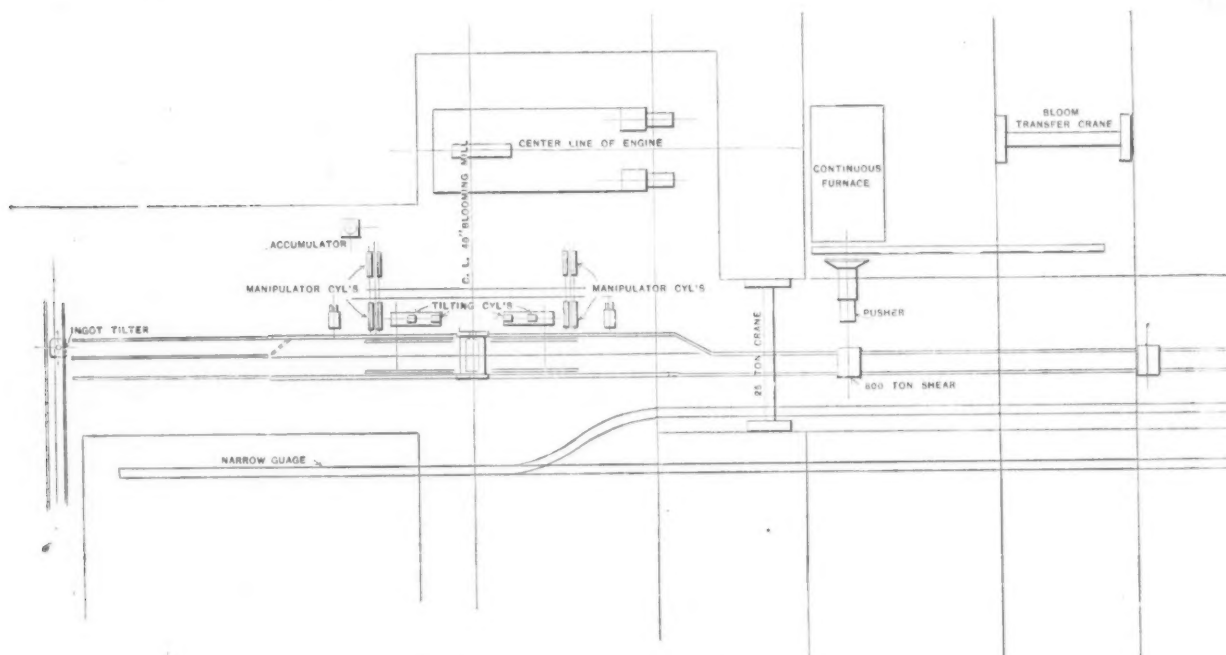


Fig. 2.—Diagrammatic Plan of the 40-In. Blooming Mill and Accessories.

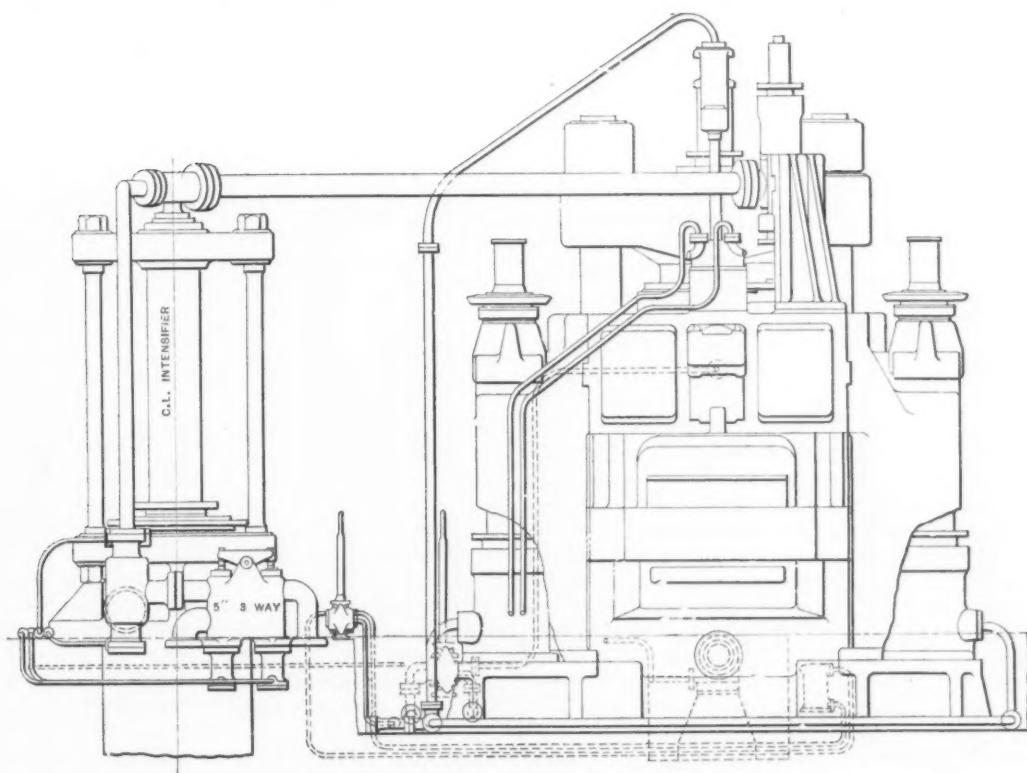


Fig. 3.—The 800-Ton Bloom Shear with Intensifier.

the mill respectively are connected by large shafts, so that they work in unison. The turning of the piece is accomplished by a tumbler, of which the principal element is a square rocker shaft connected to a lever arm and actuated by a hydraulic cylinder. The tumbler bars, sliding with the manipulator bars, are always next to the latter on the engine side of the mill and work through guides in the manipulator bars, a vertical motion being imparted to them as the square shaft rocks.

sure secured through the intensifier. The top knife is supported by the working cylinder, and this is carried by two side cylinders, to which water is admitted for raising or lowering the working cylinder, and with it the top knife. The stroke of the side cylinders is regulated by two screws operated by an electric motor, but there is this difference from the usual construction, that the screws are not subjected to any of the pressure of shearing. The use of the floating top knife economizes water

and secures rapidity of action, as the top and bottom knives are never separated by a greater distance than the thickness of the piece being sheared, plus a small amount for clearance. The bottom knife holder is connected to the upper cross head by two 14-in. bolts, and the upper cross head is an integral part of the plunger of the working cylinder.

The Bloom Transfer.

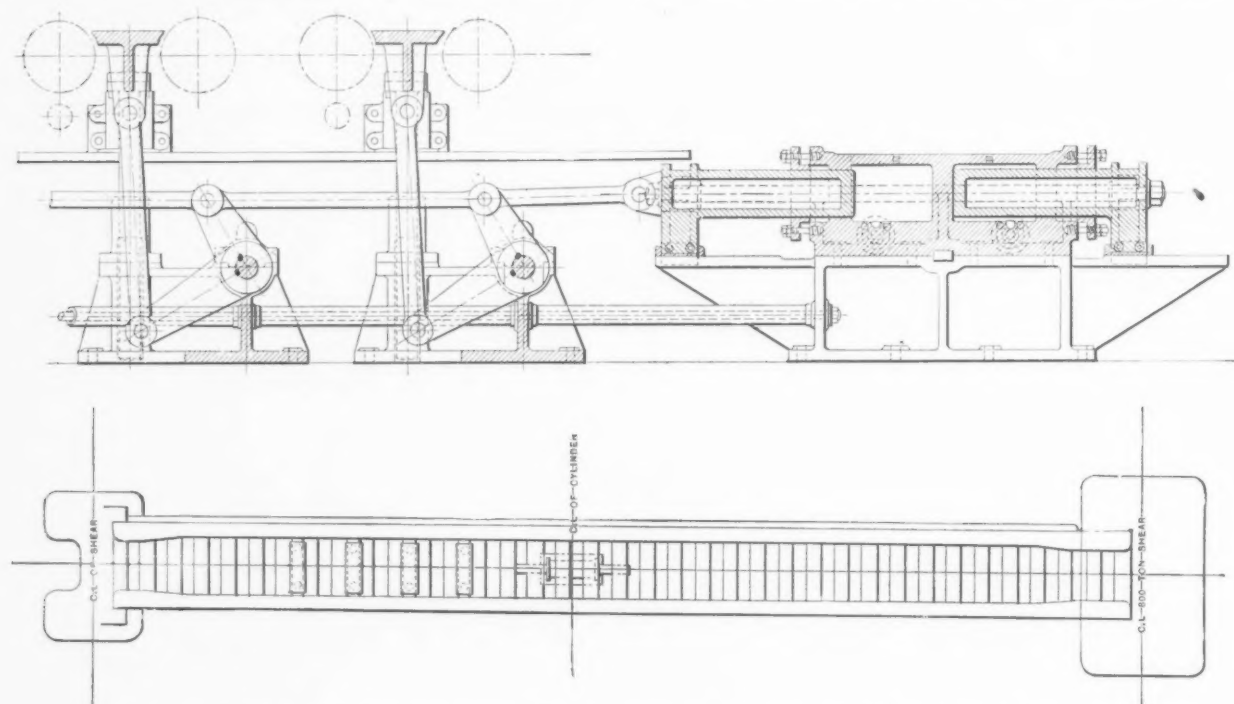
From the shear the rail blooms are carried on the roller table until they come within the space commanded by the bloom transfer crane. This is of 10 tons capacity and travels at right angles to the tables, so that it can take blooms either to the rail mill or the structural mill. Three vertical racks on the crane frame are provided for the hoisting operation, and these carry heavy hooks for picking up the blooms. The latter are elevated above the table by apron plates between the rollers, as shown in Figs. 4 and 5. The plates are mounted on hydraulic jacks operated from the same pulpit from which the shear is operated. As the bloom is held above the roller the crane hooks pick it off the aprons. Ordinarily it is taken direct to the approach table of the rail mill roughing train. If, however, the specifications call for its re-

ing, being operated by floated gears, giving an early cut off. The shaft is of nickel steel, in two similar pieces. There are four bearings on the shaft, with provision on the outside bearings for lining them up with the inside bearings, insuring the carrying of the shaft by all. The bed plates are of the bored guide type. The double bearing frame of the engine weighs 210,000 lb. and the single bearing frame 165,000 lb.

The traveling crane which transfers the blooms from the blooming mill shear table drops them upon table A, Fig. 6. This connects with the table B, which delivers the bloom to the roughing stand. On the latter there are five passes, as shown in Fig. 7. The piece is handled on either side of the roughing mill by hydraulic manipulators, attached to and forming part of tables B and C. The plungers of the cylinders operating the manipulators carry racks and have a stroke of 2 ft. The racks on their upper side engage pinions, and through these and racks with which they mesh the manipulator bars are actuated.

Rail Mill Passes and Transfers.

In line with the table C, on the delivery side of the roughing stand, is the table D, from which the rail is transferred to the table E by the use of hydraulic cylin-



Figs. 4 and 5.—Top Plan and Partial Elevation of the Lifting Jacks for the Bloom Shear Table.

heating, or if for any reason the rail mill cannot directly take the pieces as fast as they come from the blooming mill, the transfer crane drops the bloom on a table running in front of a Laughlin continuous furnace, which is 17 x 40 ft. An electric pusher introduces it into the furnace, and through the gravity discharge at the outlet end of the furnace it is dropped upon the roller table leading to the roughing stand of the rail mill. Two Laughlin continuous furnaces are provided for between the 40-in. blooming mill and the rail mill, but only one has been built as yet.

The 28-Inch Rail Mill.

The 28-in. rail mill is unique in that the roughing, intermediate and finishing trains are lined up on the same shoes. As is well known, the usual plan places the finishing rolls some distance from the roughing rolls, with tables intervening. There are three stands of three-high rolls, with two stands of three-high pinions, this arrangement allowing of the rolling of three-length or four-length rails or of structural shapes, as desired. The three tables, C, F and K, on the delivery side of the mill are made tilting for the same reason. The roughing stand was designed to be three high, though at present it is operated two high. It is driven by a 32 and 56 x 50 in. Mesta twin tandem compound piston valve reversing engine. The valves are tubular and the links self-balance-

ders and racks actuating a 5-in. shaft. The shaft carries at intervals of 9 ft. 40-in. spur wheels, and the latter mesh with racks with a stroke of 11 ft. working in guides. The piece is pushed by triggers carried on the racks. In line with the table E is the table F, leading to the intermediate stand, on which there are five passes. This intermediate stand and the finishing stand are three high and two high respectively, a dummy roll being used in the top of the finishing stand. Driving the intermediate and finishing rolls is a 44 and 76 x 60 in. cross compound automatic piston valve engine, built by the Mesta Machine Company, Pittsburgh, Pa. This, as well as the roughing engine, is operated condensing. Its nickel steel shaft has three bearings. The bed plate is of the bored guide type. There is a special governor for running constantly at varying speeds. The fly wheel weighs 200,000 lb.

The table F is arranged to handle the piece automatically by means of levers and collared rollers. On the first pass in the intermediate stand, which is No. 6, the piece enters the middle and top, being delivered to the table G and turned over to enter No. 7 pass by an angle chute. By means of collared double rollers and levers operated automatically by the rising of the table the piece is turned up to enter No. 8 pass, from which it falls to the table G, the end nearest the mill being pushed

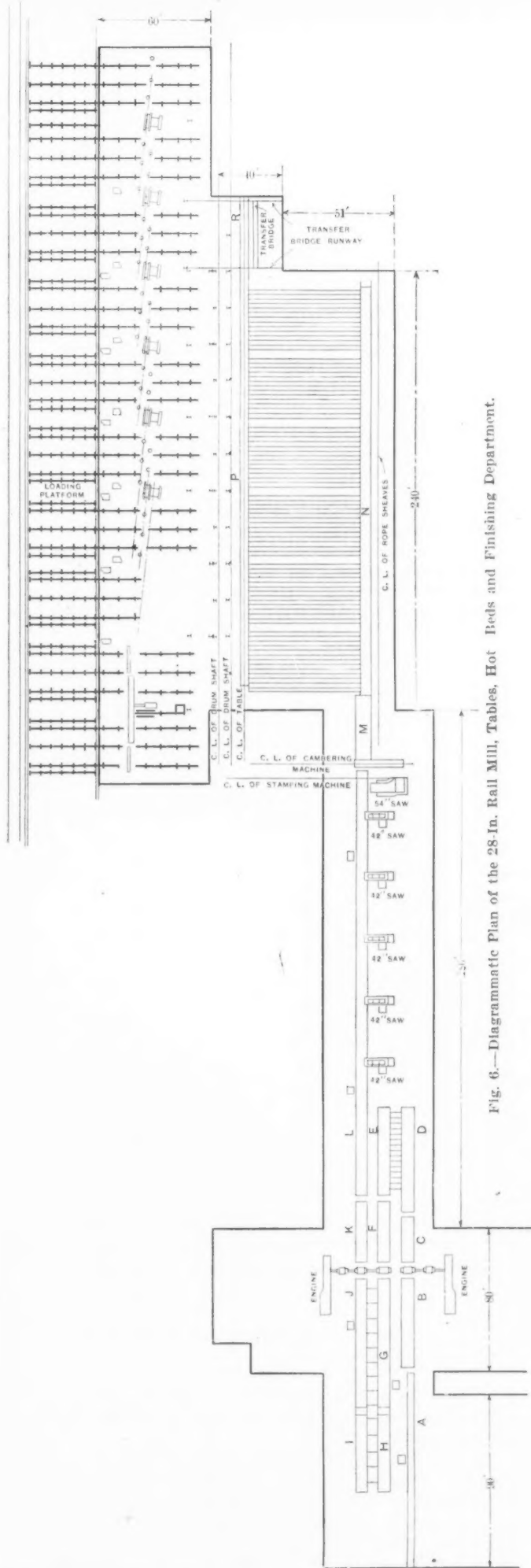


Fig. 6.—Diagrammatic Plan of the 28-in. Rail Mill, Tables, Hot Beds and Finishing Department.

ever as it falls by means of a guide on the table to enter No. 9 pass. No. 10 pass brings it back from the table F to the table G. As usual, two No. 11 or leading passes are provided, automatic push-over levers being arranged so as to be easily adjusted to deliver to either pass. The table G is extended by the idler table H, as is the table J by the idler table I. Between G and H and J and I is a hydraulic transfer similar to the one between D and E, except that it has two cylinders. The shaft of the transfer mechanism on this side is 80 ft. long, instead of 40 ft., as the length of the piece has been practically doubled by the passes on the intermediate mill.

From the table K, on the delivery side of the finishing stand, rails pass to the saw table L, which is provided with grooved rollers on the side next to the saws. The rails are guided into these by adjustable switches, which can be set to throw structural shapes to the opposite side of the table. It should be said here that the rail mill can be changed for operation either as a structural mill or as a billet mill. Five rail saws are provided, so that if desired four-length rails can be taken care of, though usually four saws are used for three-length rails. The saws are of the drop type, motor driven, and are fed to the work by hydraulic cylinders operating a hollow shaft and sliding on shoes to cut either 30 or 33 ft. lengths of rail. The crop ends drop into a cast iron chute and thence into a box placed in a pit at the side of table L. These boxes when full are picked up by a crane for loading on to a car on an outside track. A 54-in. sliding frame motor driven hot saw operated by hydraulic cylinders is provided for structural shapes, and beyond it is placed the machine for stamping the heat numbers on rails.

The motor driven cambering machine is mounted on shoes and is movable by means of a hydraulic cylinder. It is attached to a double roller with a short section of side shaft, which when the cambering machine is pulled out of line forms an extension to the table L for use on structural shapes. The table M is made of extra width to accommodate cambered rails.

The hot bed, table N, is immediately connected with the table M. Leading off from it are the six hot beds. The pull-on for each of the hot beds consists of a 15-in. channel, each pull-on being operated by a 50-hp. motor driven and 7-in. shaft. This driving shaft is arranged with clutches, so that the drums for three pull-on ropes may be operated together where structural material occupies three hot beds. The pull-off consists of two buggies to each section of hot bed, the buggies traveling on depressed tracks and carrying triggers which engage the rails. The pull-off is driven in the same manner as the pull-on, and is also arranged to be operated either separately or in sections of three. Rails are delivered from the hot beds to run out table P, at the end of which is the rail collecting table R, provided with a stop.

Rail Transfer and Distributing Crane.

From the table R the rails are taken by a special traveling crane, which with its load is conveyed from the hot bed building to the finishing building by a transfer bridge, as illustrated in Fig. 8. The bridge has a span of 36 ft. 6 in., and commands the loading skids in the end of the hot bed building. It is operated by means of a line shaft driven by a 7½-hp. motor and by vertical shafts and bevel gears. Its speed, as well as that of the rail distributing crane it carries, is 300 ft. per minute. The rail distributing crane has a span of 10 ft. 6 in. and an extreme length of 36 ft. Its frame has for its main members two 24-in. I-beams resting on wheels and the frame work carries the hoisting mechanism, consisting of three vertical racks carrying six arms or rail hooks. The racks are operated from a line shaft driven through gears by a 24-hp. motor. The speed of the hoist is 30 ft. per minute. Both the bridge and the distributing crane are operated by one man, the cage being carried by the rail distributing crane. Suitable counterweights are provided to carry the dead load of the hoisting mechanism. The transfer bridge is equipped with an automatic controller holding it in place, in line with the runway of the distributing crane while the latter is carrying rails and depositing them on the skidways adjoining the various straightening presses. The finishing department is

equipped with 12 motor driven straightening presses, an equal number of drill presses, and a motor driven cold saw, with the necessary beds and a conveyor table, which delivers rails to any point on the shipping platform. At present there are seven straightening beds; eventually this number will be increased to nine. Each has a capacity for handling 200 tons of rails in 24 hours when operating double turn. The machinery in the rail mill, except the engines, drill presses and cranes, was

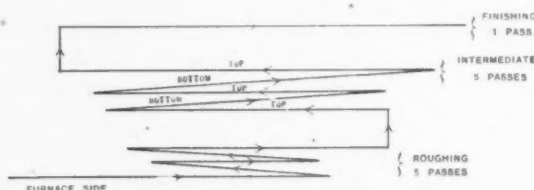


Fig. 7.—Diagram of 11 Passes in the Three Rail Mill Stands.

furnished by the United Engineering & Foundry Company, Pittsburgh, Pa.

Since the rail mill was started up, on August 30, it has been rolling 75-lb. rails for the Union Pacific Railroad. The ingots are 19 x 23 in. at bottom, and 72 in. high, and weigh about 6500 lb. After blooming down the piece is sheared into three blooms. The first of these is 13 ft. 8 in. in length, and the other two 9 ft. 2 in. long. The first rolls into three 33-ft. rail lengths, and the others into two rail lengths each, making seven rails

approach table of the roughing train of the rail mill on the other side. The 28-in. structural mill consists of three stands of three-high rolls and one stand of three-high pinions, driven by a 32 and 56-in. by 50 in. Mesta twin tandem compound piston valve reversing engine. The mill has top and bottom screws on all housings. Its arrangement is shown in Fig. 9. The same bloom transfer crane referred to in the description of the rail mill takes blooms for the structural mill from the 40-in. blooming mill shear table and drops them on a table in front of two Laughlin continuous furnaces, from which they are pushed into either furnace. In coming out they fall on the table in line with the first stand of the mill. Table B connected with table A delivers the piece to the roughing stand, and it is handled on either side by hydraulic manipulators attached to the tables B and C, which are both tilting.

In line with the table C on the delivery side of this stand is table D, from which the piece is transferred by a hydraulic transfer similar to that in the rail mill, to the table E, which has an extension marked E'. The latter is formed of apron plates only, no rollers being used, and it takes care of the long pieces on the last pass of the intermediate stand. The tilting table F is in line with the table E. On the opposite side of the intermediate stand is the table G, of which H, an idler table, is an extension. From tables G and H the piece is transferred by a hydraulic transfer to the tables I and J, of which I is an idler table, and J a driven table, entering the piece in the finishing stand. The table K on the delivery side of the finishing stand

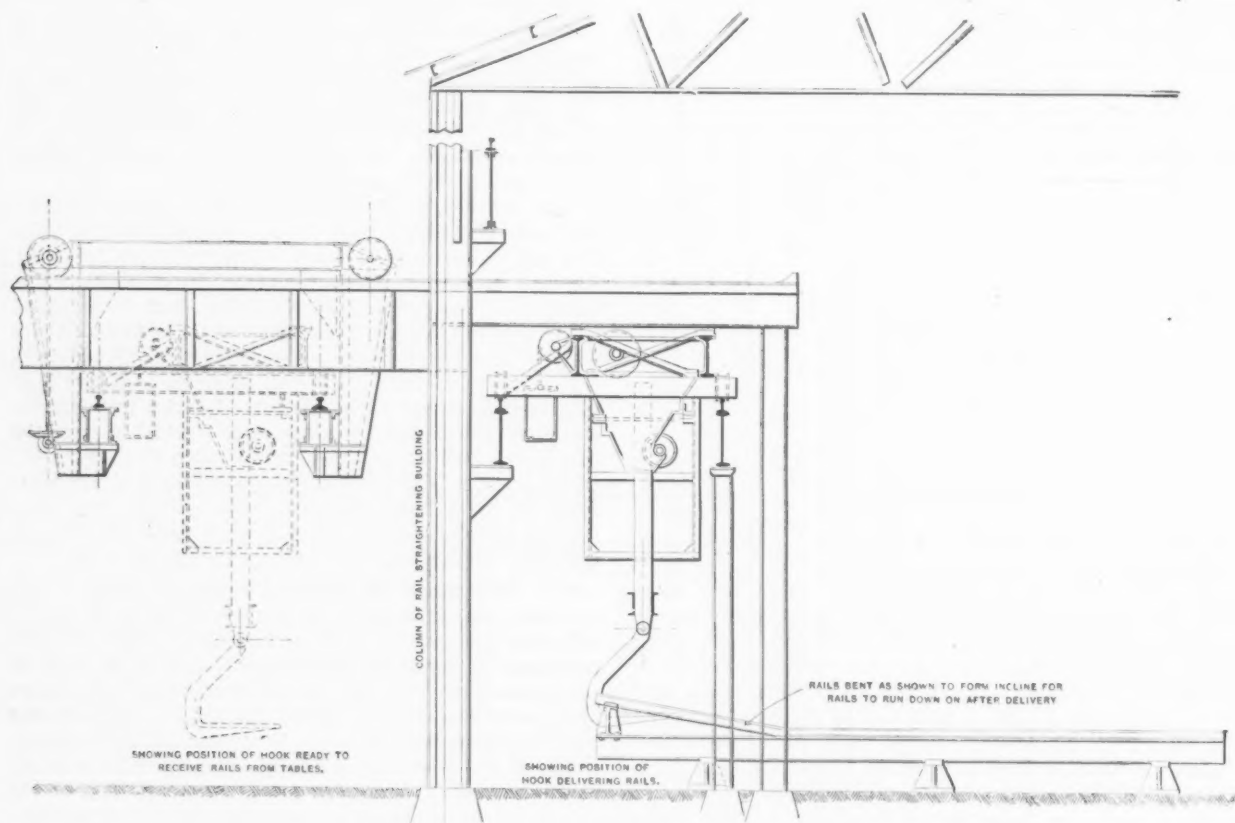


Fig. 8.—Hot Bed Transfer.—On the Left Is the Transfer Bridge in the Hot Bed Building, Carrying the Rail Distributing Crane, Which Is Shown on the Right Delivering Rails on the Straightening Beds.

from the ingot. Experience with the new features of the rail mill has been quite satisfactory, and has indicated to the designers and builders that their expectations will be fully realized, when the stage of smooth working is reached.

The 28-inch Structural Mill.

With reference to the blooming mill, the layout of the 28-in. structural mill is symmetrical with that of the rail mill. That is, the approach table of the roughing train of the structural mill is the same distance on one side of the shear table of the blooming mill as is the

approach table of the roughing train of the rail mill on the other side. The 28-in. structural mill consists of three stands of three-high rolls and one stand of three-high pinions, driven by a 32 and 56-in. by 50 in. Mesta twin tandem compound piston valve reversing engine. The mill has top and bottom screws on all housings. Its arrangement is shown in Fig. 9. The same bloom transfer crane referred to in the description of the rail mill takes blooms for the structural mill from the 40-in. blooming mill shear table and drops them on a table in front of two Laughlin continuous furnaces, from which they are pushed into either furnace. In coming out they fall on the table in line with the first stand of the mill. Table B connected with table A delivers the piece to the roughing stand, and it is handled on either side by hydraulic manipulators attached to the tables B and C, which are both tilting.

In line with the table C on the delivery side of this stand is table D, from which the piece is transferred by a hydraulic transfer similar to that in the rail mill, to the table E, which has an extension marked E'. The latter is formed of apron plates only, no rollers being used, and it takes care of the long pieces on the last pass of the intermediate stand. The tilting table F is in line with the table E. On the opposite side of the intermediate stand is the table G, of which H, an idler table, is an extension. From tables G and H the piece is transferred by a hydraulic transfer to the tables I and J, of which I is an idler table, and J a driven table, entering the piece in the finishing stand. The table K on the delivery side of the finishing stand

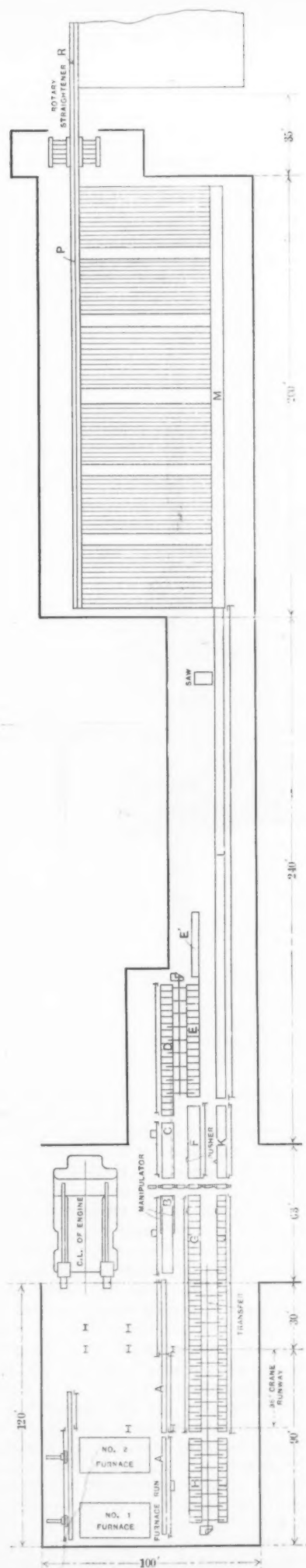


Fig. 9.—Diagrammatic Plan of the 28-In. Structural Mill, Tables, Hot Beds and Finishing Department.

rolls in one machine are provided with grooves for angles and in the other machine with grooves for beams and channels. A short section of table is placed between these machines, the whole being arranged to slide on shoes by means of a hydraulic cylinder, so that either machine may be used, or material may be run on the table R without straightening. The shapes are handled off the table R by traveling cranes to the storage and shipping yard. All the machinery in this mill, except the engines and cranes, was furnished by the United Engineering & Foundry Company.

Storage and Ship Yards.

The structural mill storage and shipping yards, of which a view is given in an accompanying illustration, are a noteworthy feature of the new Saucon plant. They contain every facility for the quick and economical handling of material from the 28-in. structural mill and the Grey universal beam mill. Roller tables from these mills deliver the material through and under all of the crane runways, and eventually into a structural shop at the east end of the yard, where the Grey beam mill products will be prepared for fabrication. This storage and shipping yard is 750 x 800 ft., and is equipped with nine parallel 84-ft. storage crane runways, with a transverse runway across each side, intersecting with the others. The tract upon which the yards are located contains 14 acres, and is equipped with 13 double trolley 10-ton cranes built by Pawling & Harnischfeger, Milwaukee, Wis., completely covering the yards. The structural finishing shop will be 120 x 480 ft., and will contain an equipment of punches, multiple drills of notable capacity and construction, and facing machines for finishing beams and columns.

The Grey Universal Beam Mill.

In the general article of November 1, 1906, dealing with the Saucon plant, extended reference was made to the shapes produced on the Grey universal mill and to the considerations on which their introduction into the United States is based. Details of the construction of this portion of the new South Bethlehem plant are not available, but reference may be made briefly to the work that is now nearing completion. The 46-in. blooming mill and the two 48-in. Grey beam mills, as shown on the general plan view, Fig. 1, are arranged tandem for continuous production from the ingot to the finished shape without reheating.

A 40 x 66 x 54 in. twin tandem compound reversing engine with geared connection drives the blooming mill. The blooms pass a hydraulic shear where the ends are cropped and are then delivered to the first or intermediate Grey mill, and then to the second or finishing mill. At Differdingen the beams are finished from the blooms by a single Grey mill, but at Bethlehem the use of two mills, one for roughing and the other for finishing, will give an increased capacity, an output of 1000 tons a day being expected. Each of these mills is driven by twin tandem compound reversing engines, exact duplicates of the 46-in. blooming mill engine, except that they are direct connected to the mills. All parts of the Grey mill works are commanded by overhead electric traveling cranes. After being hot sawed to length the beams pass to a water cooled hot bed of liberal area. A driven roller table from the straightener extends the full width of the storage yard for finished shapes, and later will be extended for delivering beams direct from the mill to the fabricating shop. The mills and mill equipment of the Grey works were built by the company in its own shops, except the three engines, which were furnished by the William Tod Company, Youngstown, Ohio. These mills are now practically completed with the exception of the electric wiring, hydraulic piping and a few other minor details.

In construction the Grey mills are somewhat similar to a universal plate mill, with separate sets of horizontal and vertical rolls. These sets of rolls form the web and flanges by combined rolling operations acting at right angles. Both web and flanges are produced in a manner similar to the rolling of universal mill plates. The Grey mills at Bethlehem are like that at Differdingen, Germany, also built by Henry Grey & Son, except that the Bethlehem mills are larger and embody many improve-

ments and modifications that have been suggested by the five years of operation of the mill in Germany, which has been producing beams up to 30-in. in depth with flanges 12 in. wide.

In the ordinary beam mill the web is the only part of the shape which is formed by an actual rolling operation, the flanges being produced by crowding and dragging the metal through the flange grooves where no rolling action is possible, owing to the construction of the rolls. In the production of a beam by the ordinary mill the outer edges of the flanges are churned by the upper and lower rolls and the points of contact with the shape are acting with a large difference in linear speed. In the case of a 24-in. beam, with flanges 7-in. wide, rolled in a 28-in. usual beam mill, the middle roll at its point of contact with the outer edge of the beam flange is 21 in. in diameter, while the upper or lower rolls at their points of contact with the same outer edge of the beam flange are 35 in. in diameter. As both rolls have the same angular velocity, their linear velocity at the points of contact with the outer edge of the beam flange are in proportion to their diameters at such points of contact, or, in other words, one roll is moving with a speed of one and two-thirds times the velocity of the other roll. The effect of this, especially on the larger sizes of beams rolled by the usual method, causes a large variation in the physical quality of the material in the webs and flanges.

By means of the Grey method of rolling beams, the sections can be designed to give economical distribution of the metal, larger beams can be rolled and the flanges can be made very much wider than it is possible to produce in the usual beam mill. The wide flange beams rolled by the Grey mill in Germany are extensively employed in bridge and building construction in Europe, England, Canada and other foreign countries. The smaller sizes are used for column purposes and the deeper sections are used to take the place of riveted girders. The operation of the Grey mills at Bethlehem will make the advantages of such sections available to engineers and constructors for the first time in this country.

The Grey mill produces beams by the same method as is used in the rolling of universal mill plates with a practically uniform amount of reduction in the rolling for all parts of the shape. Beams of all sizes and shapes rolled by the Grey mill in Germany have shown great uniformity in physical quality of material throughout the section, thus indicating equal reduction work in the rolling process and the absence of internal stresses. Such sections, it is claimed, are more reliable than beams rolled in the old way, especially when they are to be used in places subject to impact and vibration.

In the production of the larger sizes it is intended to use ingots up to 10 tons in weight, so that the work of reduction in rolling the shapes will be sufficient to develop proper ductility of the metal.

For the design and construction of the entire Saucon plant, Henry Grey & Son, 68 William street, New York, were consulting engineers.

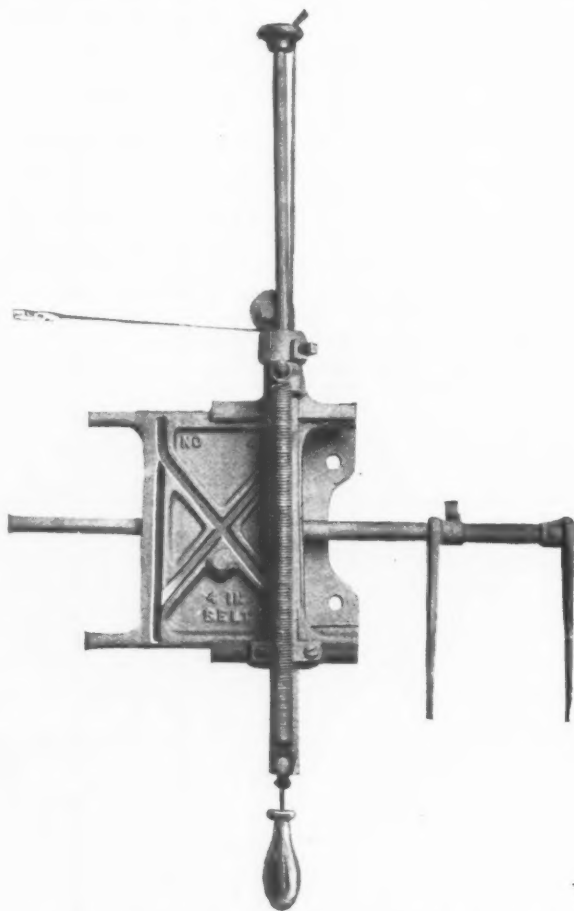
The Diamond Belt Shifter.

The only positive lock belt shifter is claimed to be the one illustrated, which is made by the Diamond Clamp & Flask Company, Richmond, Ind. In the form shown it may be bolted to a hanger or board in any way that is most convenient. It is made in three styles, to be operated directly by pulling the pendant handle, or by a cord attached to the top and carried over guiding pulleys to any point, or in connection with a floor stand, to be operated by the pressure of the hand on the knob at the top or the pressure of the foot on a treadle at the bottom.

The parts are few and consist of a frame in which the cam plate carrying the shifting fork slides laterally, and a rod, carrying a pivoted shoe engaging the grooves in the cam plate, slides vertically. A spring holds the latter normally at the upper limit of its strike. When the rod is pulled downward the shoe working in the groove slanting downward to the left moves the plate and with it the fork to the right, and the shoe rides over into the vertical groove at the left. As the spring returns the rod, the shoe follows this groove and rides over a hump into the vertical portion of the other diagonal groove. In this

position the shifter is locked until another pull on the rod causes the shoe to follow the groove slanting downward to the right and the fork is drawn back to its first position. The return of the rod by the spring leads the shoe up a right hand vertical groove, hidden in the engraving, locking the shifter as before. The reduction in the depths of the grooves, at the ends where the shoe leaves them, forms the switches that insure a continuous cycle of operations in the same direction. It will be seen that there is no time in the operation of the shifter that it is not locked and under perfect control of the operator.

The shifters are made in five sizes, each adaptable to a range in width of belt of 1 in., increasing by quarter inches; for example, the smallest may be fitted with either of four plates for 1¼, 1½, 1¾ and 2 in., respectively, and the largest for 5¼ to 6 in. belts by similar



A Positive Lock Belt Shifter Made by the Diamond Clamp & Flask Company, Richmond, Ind.

steps. The fork prongs may be adjusted on the fork rods for various widths of belt, and the fork rods in the cam frames for various distances from the belt to the shifter frame, but the throw of each cam plate is invariable, so that a different one is necessary for each different width of belt. Presumably the average dealer would have to carry an almost prohibitive amount of stock to cover even the most usual requirements. By a thoughtful selection of parts, however, the manufacturer has considerably simplified the problem in what is recommended as a dealer's stock. From this a shifter may be assembled for any of the widths of belt between 1½ and 4 in. in any of the three styles. This stock comprises three sizes complete, each equipped for a different style of manipulating, and the necessary extra plates, 11 in all.

The Diamond belt shifter is applicable to all kinds of countershafts and hangers. If the countershaft is already up, the shifter may be bolted to a board and the board nailed to a joist, or by casting a lug on the hanger any size shifter may be attached to it. The company furnishes two sizes of complete countershafts equipped with this shifter, one carrying 2 x 6 in. tight and loose pulleys and a 3 x 12 in. driving pulley, and the other 4 x 10 in. tight and loose pulleys and a 6 x 16 in. driving pulley. Hangers are also furnished separately, so that a millwright may make up his own countershaft.

New Massachusetts Boiler Rules.

The new Massachusetts Board of Boiler Inspectors, established under an act of legislature early this year, has promulgated the first sections of its rules, covering minimum pressure on boilers, shearing strength of rivets, factors of safety and fusible plugs. Under the rules the maximum pressure allowed on any steam boiler constructed wholly of cast iron shall not be greater than 25 lb. per square inch, and on any steam boiler, the tubes of which are secured to cast iron headers, not greater than 100 lb. per square inch. The maximum pressure allowed on any steam boiler constructed of iron or steel shells or drums shall be calculated from the inside diameter of the outside course, the percentage of strength of the longitudinal joint, and the minimum thickness of the shell plates, the tensile strength of shell plates to be taken as 55,000 lb. per square inch for steel and 45,000 lb. per square inch for iron, when the tensile strength is not known.

The maximum shearing strength of rivets per square inch of cross sectional area to be taken as follows: Iron rivets in single shear, 38,000 lb.; iron rivets in double shear, 70,000 lb.; steel rivets in single shear, 42,000 lb.; steel rivets in double shear, 78,000 lb.

The lowest factors of safety used for steam boilers, the shells or drums of which are directly exposed to the products of combustion, and the longitudinal joints of which are lap riveted construction, shall be as follows: Five for boilers not over 10 years old; 5.5 for boilers over 10 and not over 15 years old; 5.75 for boilers over 15 and not over 20 years old; 6 for boilers over 20 years old; 5 on steam boilers, the longitudinal joints of which are of lap riveted construction, and the shells or drums of which are not directly exposed to the products of combustion; 4.5 on steam boilers, the longitudinal joints of which are of butt and strap construction.

Fusible plugs shall be filled with pure tin. The least diameter of fusible metal shall not be less than $\frac{1}{2}$ in., except for working pressures of over 175 lb. gauge, or when it is necessary to place a fusible plug in a tube, in which cases the least diameter of fusible metal shall not be less than $\frac{3}{8}$ in. The location of fusible plugs shall be as follows:

In horizontal return tubular boilers, in the back head, not less than 2 in. above the upper row of tubes and projecting through the sheet not less than 1 in.

In horizontal flue boilers, in the back head, on a line with the highest part of the boiler exposed to the products of combustion and projecting through the sheet not less than 1 in.

In locomotive type or star water tube boilers, in the highest part of the crown sheet and projecting through the sheet not less than 1 in.

In vertical fire tube boilers, in an outside tube placed not less than one-third the length of the tube above the lower tube sheet.

In vertical submerged tube boilers, in the upper tube sheet.

In water tube boilers, horizontal drums, Babcock & Wilcox type, in the upper drum, not less than 6 in. above the bottom of the drum and over the first pass of the products of combustion, projecting through the sheet not less than 1 in.

In Sterling boilers, standard type, in the front side of the middle drum, not less than 6 in. above the bottom of the drum and projecting through the sheet not less than 1 in.

In Sterling boilers, superheated type, in the front drum, not less than 6 in. above the bottom of the drum and exposed to the products of combustion, projecting through the sheet not less than 1 in.

In water tube boilers, Heine type, in the front course of the drum, not less than 6 in. from the bottom of the drum and projecting through the sheet not less than 1 in.

In Robb-Mumford boilers, standard type, in the bottom of the steam and water drum, 24 in. from the center of the rear neck and projecting through the sheet not less than 1 in.

In water tube boilers, Almy type, in a tube directly exposed to the products of combustion.

In vertical boilers, Climax or Hazelton type, in a tube or center drum not less than one-half the height of the shell, measuring from the lowest circumferential seam.

In Cahall vertical water tube boilers, in the inner sheet of the top drum, not less than 6 in. above the upper tube sheet.

In Scotch marine type boilers, in combustion chamber top and projecting through the sheet not less than 1 in.

In dry back Scotch type boilers, in rear head, not less than 2 in. above the top row of tubes and projecting through the sheet not less than 1 in.

In Economic type boilers, in the rear head above the upper row of tubes.

In cast iron sectional heating boilers, in a section over and in direct contact with the products of combustion in the primary combustion chamber.

For other types and new designs fusible plugs shall be placed at the lowest permissible water level, in the direct path of the products of combustion, as near the primary combustion chamber as possible.

An Elevator Suggestion for Preventing Accidents.

A well-known architect of Worcester, Mass., impelled by a series of fatal elevator accidents in one building, has been working out the suggestion for a remedy of a certain class of accidents against which there is at present no safeguard. In writing to a local newspaper, he says:

In view of the recent second fatal accident in the passenger elevator of a local building, and the fact that nearly parallel cases are of almost daily occurrence throughout the country, should not some further means for protection be devised?

Consider, for a moment, the vast number of people who enter and leave the elevators of the office buildings, stores, &c., of our own comparatively small city and realize that, for one reason or another, each passage from the solid floor of a building to the movable one of an elevator car is a hazard and the importance of the subject becomes most evident, and action most imperative.

Buildings are equipped in the majority of cases with cars thoughtlessly designed where their relation to the several fixed floor lines is considered, so there is constant chance of shearing or crushing a human body at each instance of entrance or exit, the accident occurring most frequently in the downward trip, and yet among all the dangers for which safeguards are provided, this one common cause of accident to the individual, or at all events the direct method of prevention, seems to have been overlooked.

Would not the simple expedient of making the entrance opening to the car of full height of its wall and extending a suitable distance backward in its top covering be equal to removing the knife from the guillotine?

A rigid yoke above a car opening forms one blade of a shear, the building floor at the well opening forms its fellow—with the removal of the former the latter ceases to be an element of danger, with the result that accidents similar to those referred to become almost impossible.

If the customary light screen or grill is desirable protection over the whole top of the cage, then let a portion of it, opposite the entrance, be hinged or pivoted to act as a lid, counterbalanced if necessary, thus offering slight resistance to an object partly within and partly without the well at the period when the car passes a floor line.

Something in the way of protection during upward trips of a car can be secured by an arrangement of the usual door and screen enclosing many wells, whereby the head or hand incautiously or otherwise thrust beyond the danger line would come in contact with a yielding construction and receive a warning or possibly a minor pinch before the rigid ceiling line was reached.

The De La Vergne Oil Engine.

Kerosene engines are not as common as gas and gasoline engines, although they have been on the market for over 15 years. A type which is well known is the Hornsby-Akroyd oil engine, a heavy slow speed single acting horizontal machine, built by the De La Vergne Machine Company, New York, in sizes up to 250 hp. While this engine is successfully applied to all kinds of stationary and even portable work, there is a demand for a lighter faster and vertical engine more suitable for marine purposes and for driving direct connected high speed, and therefore low priced, electric generators, fans, centrifugal pumps, &c. The De La Vergne Company has been experimenting several years to develop such an engine, and now that a number have been operating very satisfactorily for many months at various kinds of work.

same engine with one-half in section. The air port A and the exhaust port E at the middle of the cylinder indicate at once that the engine operates on the two-stroke cycle and is single acting; hence in a twin cylinder engine the crank shaft receives two impulses during each revolution, causing the engine to run much steadier than a four-cycle engine. The chief characteristic is the absence of an electric igniter, which avoids the troubles experienced with batteries or other sparking devices, and a mixing valve is also done away with. Similar to the Hornsby-Akroyd engine, the cylinder head V is shaped as a bulb and is kept hot enough by the successive explosions to ignite the combustible mixture. This bulb or vaporizer is made of gun iron and is heated up at the start by a kerosene blow lamp. When so heated a few drops of oil are injected by depressing the knob K and at the same time the flywheel is given a half turn by hand.

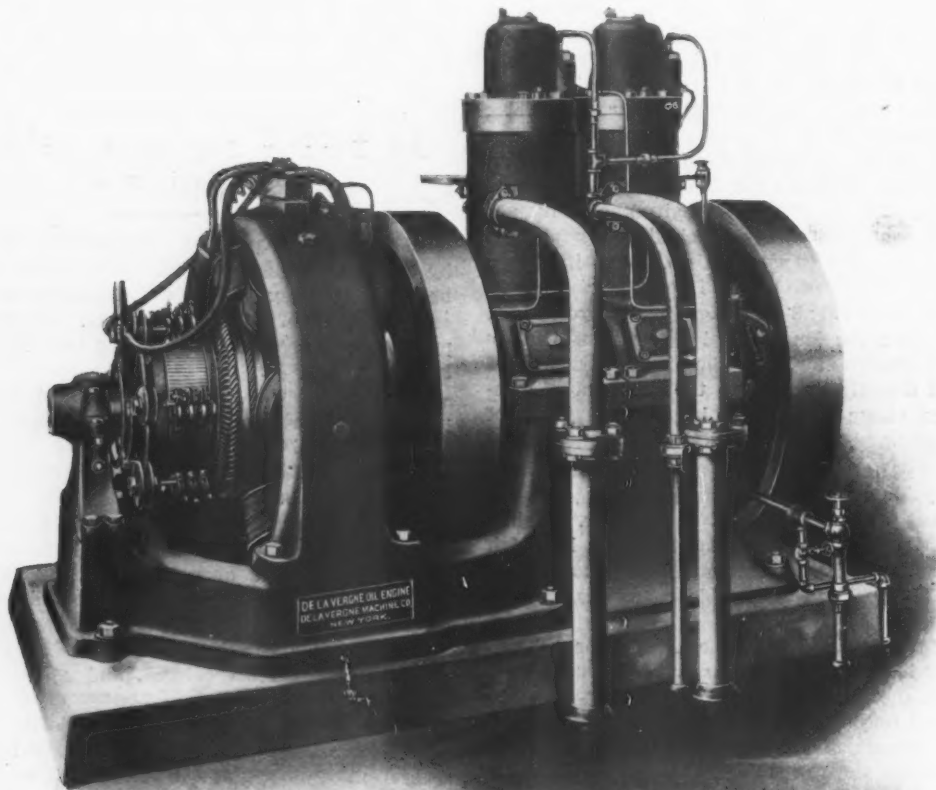


Fig. 1.—A Twin Cylinder 15-Hp. De La Vergne Oil Engine Direct Connected to a 10-Kw. Electric Generator.

it has been decided to manufacture them as now perfected. The De La Vergne oil engine is especially designed to use ordinary kerosene or fuel oil, obtainable anywhere, and not for gas or gasoline, thus eliminating such danger as attends the latter.

Granted that an oil engine consumes the same weight of fuel per brake horse-power per hour as a gasoline engine—namely, about nine-tenths of a pound,* 1 gal. of oil will develop $6.7/0.9 = 7.44$ hp. for 1 hr., while 1 gal. of gasoline will develop $5.8/0.9 = 6.44$ hp. for 1 hr. The relative market prices are at present 10 cents and 17.5 cents, respectively; consequently one brake horsepower-hour costs, with oil, $10/7.44 = 1.34$ cents, and with gasoline $17.5/6.44 = 2.72$ cents, or fully twice as much. With fuel oil the cost is lower still. A consumption is guaranteed of not to exceed 1 lb. of oil per brake horsepower per hour when the engine is properly operated and is running at from three-quarters to full load.

Fig. 1 shows a twin cylinder De La Vergne engine, direct connected to an electric generator, and Fig. 2 the

Preignitions, which cause much annoyance and loss of power, cannot occur in this engine, for on the up stroke there is nothing but pure air in the cylinder, which has entered under slight pressure from the inclosed crank case through the port A. Just as the piston is reversing its motion, and not before, oil is sprayed into the vaporizer V by the nozzle N. The heat of the walls of the vaporizer and of the air, resulting from its being compressed, at once vaporizes the oil and burns it rapidly, thus giving the descending piston an impulse. Just before the end of the down stroke the exhaust port E is uncovered by the piston to let the burnt gases escape to the atmosphere, and immediately thereafter the air port A is uncovered, admitting the air which has been compressed in the crank case during the down stroke. The shape of the top of the piston is such as to direct the inrush of air to the top of the cylinder, completely displacing the burnt gases, forcing them out through the exhaust port E and thoroughly scavenging the cylinder. The air at atmospheric pressure remaining in the cylinder begins to be compressed on the up stroke as soon as the ports A and E are covered by the piston, and simul-

*The thermal value of the various kinds of oil fuels irrespective of their specific gravities is substantially the same per pound—4.e., 19,860 B.t.u.

taneously more air for the next cylinder charge is being drawn into the crank case through an automatic poppet valve.

It is necessary that the oil be forced into the vaporizer suddenly, at the right time and in quantity to suit the

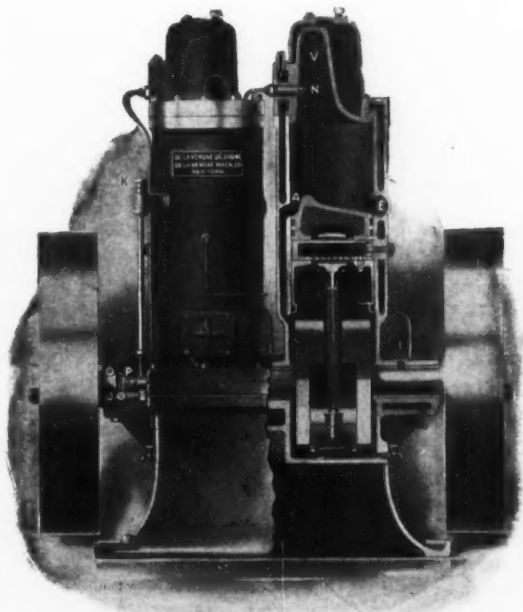


Fig. 2.—A Twin Cylinder with One Half in Section.

load on the engine. This is accomplished by a small plunger pump, which is under the control of a simple and ingenious throttling governor fastened to and revolving with the flywheel. Fig. 3 shows its arrangement. It will

cause the counterweight K to overcome the tension of the spring S, thus withdrawing the wedge W. The spring E tends to keep the roller A in contact with the cam ring R, and when the wedge is withdrawn the buffer G cannot actuate the pump plunger and no oil will be injected. The two concentric slots in the frame F allow of making an adjustment when it is desired to greatly change the normal speed of the engine. For smaller speed variations the spring S can be shifted in the holes of the lever L. The close regulation obtained with this governor and the high rotative speed make the engine admirably suited to electric work.

Fig. 4 gives a section of the spray nozzle. This is so arranged that it very rarely requires cleaning out, deep helical grooves being cut in the spray pin. The pressure under which the oil is forced through keeps these grooves clean. The nozzle can be cleaned and replaced within a few minutes. A steel ball check valve prevents the explosion from firing back into the oil pipe. The entire nozzle is inserted in a section of the vaporizer, which is cooled by circulating water.

The crank shaft of either a single or twin cylinder engine is one solid steel casting with liberal bearing surfaces. The balance weights are cast on so that they never can become loose and they reduce vibration to a minimum. In some engines lubrication of the crank pins is derived from the oil splashing about in the crank case and is cut off if the oil holes become clogged. In the De La Vergne engine, however, a centrifugal crank pin oil ring is turned from the solid in each crank, and straight oil holes, which are always kept clear by the action of centrifugal force, lead to the pins.

All oil cups have been eliminated, oil being supplied to the cylinders and all bearings, except the wrist pin, from one forced feed central oiler actuated from the crank shaft. After the oil reservoir is filled for the day oiling requires no more attention. The steel wrist pin in the piston is care hardened and ground and contains a large oil receptacle which holds enough oil for several

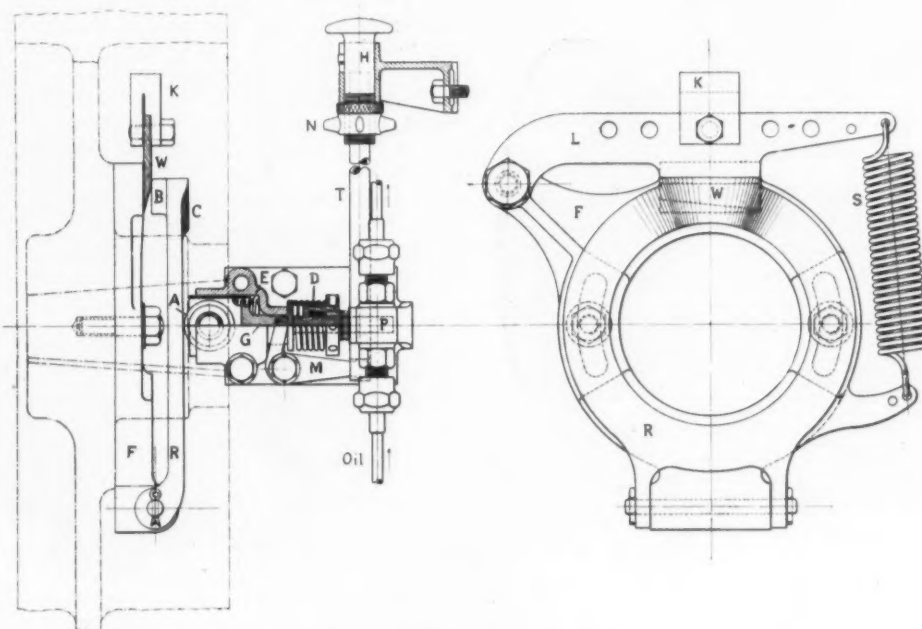


Fig. 3.—Details of the Governor and Fuel Pump.

be seen that there is a frame, F, fastened concentrically to the inside of the flywheel with two studs. To this frame is hinged the cam ring R, having a projection, B, on the flywheel side, and back of that a cam projection, C, which deflects the roller A once each revolution of the flywheel, thus moving the oil pump plunger P. The stroke imparted to the pump plunger is gauged by the lever L pivoted to the frame F. This lever has a wedge, W, which separates the cam ring R from the frame F. When the engine is started the governor does not come into action until the normal speed is approached. Under light load the speed will increase until centrifugal force

weeks' running. It is then refilled through the side of the cylinder.

A peculiar as well as commendable feature of the lower half of the crank case is the arrangement for water cooling. A small rotary pump driven by a spur gear on the shaft circulates water, first through this crank case and around to the bearings; then through the cylinder heads around the spray nozzle. This cooling water prevents heating of the air aspirated into the crank case and keeps down the temperature of the lubricating oil and the bearings. It represents quite a departure from the usual design. The shaft bearings and the lower half of the

center bearing in the case of the twin cylinder engines are lined with special bearing metal. The upper half of the center bearing is of phosphor bronze and makes an airtight joint between the two crank cases. Bronze spring packing rings are used in the outer bearings to prevent loss of air or of lubricating oil along the crank shaft. All bearings are bored and scraped to fit the shaft.

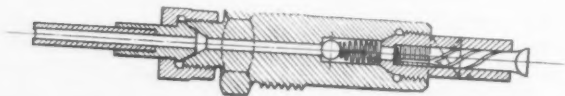


Fig. 4.—A Section of the Oil Injecting Nozzle.

The connecting rod is of cast steel, with a phosphor bronze cap and special bearing metal at the crank end and bronze bushing at the wrist pin end.

The engine has no complex mechanism. All parts are accessible, and its design is easily understood; therefore it can be readily operated by any one without previous experience. For marine work the stationary base is omitted, and a 15-hp. engine of this type weighs, complete with oil tank, water circulating pump and exhaust muffler, 1180 lb., and occupies a floor space of 26 x 42 in. For stationary use the complete engine has two flywheels, or one heavy flywheel and pulley and cast iron base, and weighs 1500 lb. The 7½-hp. single cylinder engine weighs without base, 750 lb., and with base, as shown in Fig. 5, 960 lb., and occupies a floor space of 29½ x 30 in. For marine use only one flywheel is supplied. The cylinders

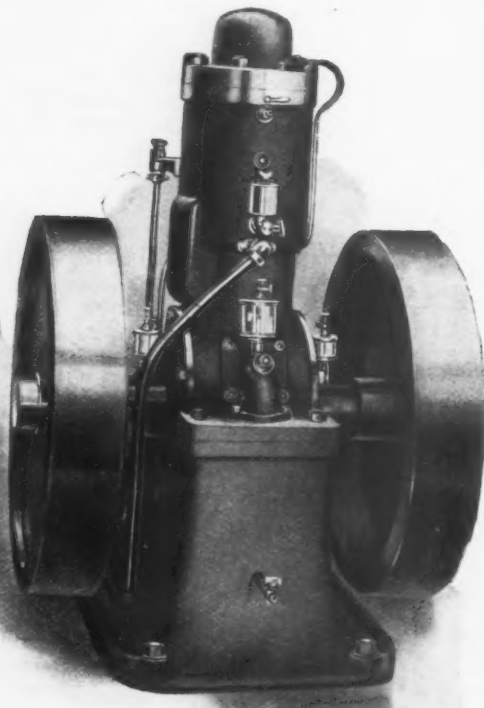


Fig. 5.—A 7½-Hp. Single Cylinder De La Vergne Oil Engine.

of both engines are 7 in. in diameter by 7½ in. stroke and the flywheels are 26 in. in diameter by 5 in. face. The normal speed of each engine is 450 re. per min. Engines of other sizes are under construction.

The De La Vergne oil engine can be run in either direction without changing any part. Every engine is tested at the works as to power development, regulation and economy of fuel. The combustion is so perfect, it is claimed, that, unlike other oil engines, no carbon is deposited in the cylinder, and the vaporizer need not be cleaned oftener than twice a year if the engine is run on kerosene. A high efficiency is the consequence of the almost perfect combustion. The principal advantages of

the new engine are declared to be absolute safety, reliability, economy, high speed, small space occupied and little weight. Since no carbureter or valve motion is used, the engine is one of the simplest ever devised.

Molding Sand Produced in 1906.

WASHINGTON, D. C., September 23, 1907.—The production of molding sand in the United States in 1906 amounted to 3,371,103 net tons, valued at \$2,063,151, as compared with 3,084,008 tons, valued at \$2,102,423 in 1905. These figures are taken from the annual report of the United States Geological Survey. The totals for both years include sand used for all kinds of molding—brass, steel, iron, brick, pig bed, &c. The price of this sand varies from 30 cents to over \$1.50 per net ton according to the grade of sand and the class of work done. Ohio reports the largest output of this sand, its production for 1906 being 816,540 tons, valued at \$555,910. Pennsylvania, New Jersey, Illinois and New York follow in the order named, each having an output valued at over \$100,000.

Molding sand, says the report, varies from clayey loam to a clean, sharp, coarse sand, according to requirements. Practice is so diverse in various lines and in different foundries that not only is a great variety of so-called sand used in its natural state, but in many instances various other ingredients, such as loam, clay, oil, flour, and molasses, are mixed in definite proportions with the sands to give results desired. Three essential qualities in molding sand are refractoriness, porosity, and bond. In general, the finer and more intricate the design the finer the sand required. Its refractory nature is governed by the presence of a high content of silica and the absence of such fluxing constituents as lime carbonate, alkalies, and iron oxides. The material, including the bond, must possess at the same time plasticity and strength. It must be plastic in order to be molded around the pattern, and it must have sufficient strength to stand when unsupported by the pattern and to resist the impact of the metal when poured into the mold. Too much clay and iron oxide will cause the mold to shrink and crack under the intense heat, yet too little will cause it to dry and crumble, if not to collapse entirely. Under a simple preliminary examination a good sand should show to the unaided eye grains nearly uniform in size, angular rather than round, and when spread on dark paper it should show no dust. To the touch the sand should feel sharp rather than smooth, and when moistened with 10 to 20 per cent. of water it must be capable of being formed into balls which will not become pulpy or be too easily crushed.

It is evident from the foregoing statements that the physical properties of molding sands are of much more importance than their chemical composition, and that sands which, on analysis fail to reach the required purity as glass sand, may possess still greater intrinsic value as molding or furnace sand. The following analyses show the average chemical composition and relative fineness of grain of standard molding sands used for various purposes:

Sand for Delicate Molding.—Silica, 81.50; alumina, 9.88; iron oxide, 3.14; lime, 1.04; magnesia, .65; grain, fine.

Sand for Medium Class Molding.—Silica, 84.86; alumina, 7.03; iron oxide, 2.18; lime, .62; magnesia, .98; grain, medium.

Sand for Heavy Castings.—Silica, 82.92; alumina, 8.21; iron oxide, 2.90; lime, .62; magnesia, 0; grain, coarse.

W. L. C.

The Gulf Compress Company, operating cotton compresses at many points in Mississippi, has been ordered by the State authorities to close its business and withdraw from the State in 12 months. Suit against the company was brought on the ground that it was violating the anti-trust laws of Mississippi in that it combined and controlled a large number of cotton presses in the State, thus monopolizing the business and fixing the price of cotton pressing. The case will be appealed to the Supreme Court.

The Canedy Gasoline-Driven Pumping Engine.

A new direct-connected self-contained gasoline engine pumping outfit, designed and manufactured by Earl Canedy, Chicago Heights, Ill., is shown in the accompanying illustrations. The pump, which is driven by a horizontal engine, is adapted to both deep and shallow well pumping, and is simply constructed, to meet the needs of general service in the hands of unskilled operators. Fig.



Fig. 1.—A 2½-Hp. Gasoline Engine Driven Pump Made by Earl Canedy, Chicago Heights, Ill.

1 shows the outfit mounted on a substantial cast iron sub-base of sufficient height to raise the engine and mechanism to a convenient position for starting and general attention. The cylinder, head and water jacket are cast in one piece, eliminating the necessity for use of packing to guard against gas and water leakage. For deep well pumping the pump cylinder is placed below the water line, and for shallow pumping it is located within the base of the engine; both intake and discharge pipes enter

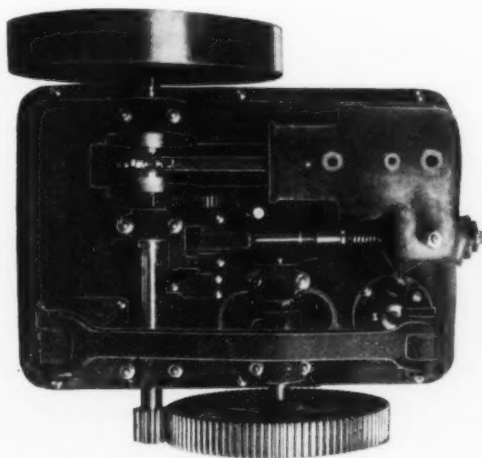


Fig. 2.—Top View of the Canedy Gasoline Driven Pumping Engine.

and leave the cylinder through openings in the opposite side of the base. The rocker arm operating the pump is oscillated by a 1½-in. crank, the thrust of which is taken by two large bronze bushed bearings. The driving gears have a 2-in. face and are cut from the solid. To provide for wear replaceable bronze bushings have been used throughout. A general arrangement of the working parts of the pump and engine, all of which are interchangeable, is shown in Fig. 2. The engine, which develops 2½-hp., it is stated, will pump about 2000 gal. of water per hour to a height of 50 ft. on a consumption of 1½ to 2 pints of gasoline. It is operated with jump spark igni-

tion, using the breech block spark plug. Besides its use in ordinary pumping service the outfit is especially adapted to spraying, and for this purpose is mounted on a wagon tank without the subbase. The compactness of the equipment makes it especially suited for work of this character. With slight additional expense the engine can be arranged for driving grindstones, washing machines, cream separators or work of like character. It is made in but one size, and it is the purpose of the manufacturer to sell it through agencies only, which are being placed with a leading hardware dealer in each locality.

Production of Coal in the United States from the Earliest Times to the Close of 1906.

An advance chapter from "Mineral Resources of the United States, Calendar Year 1906," on the production of coal in 1906, by E. W. Parker, chief statistician of the United States Geological Survey, says:

So far as known, the first mention of the occurrence of coal in the United States is contained in the journal of Father Hennepin, a Jesuit missionary, who, in 1679, recorded a "cole mine" on Illinois River, near the present city of Ottawa, Ill.

Coal was first mined in the Richmond basin, Virginia, about 70 years after Father Hennepin's discovery in Illinois, but the first records of production from the Virginia mines were for the year 1822, when, according to one authority, 54,000 tons were mined.

Ohio probably ranks second in priority of production, as coal was discovered there in 1755, but the records of production date back only to 1838.

The mining of anthracite in Pennsylvania began about 1790, and it is said that 55 tons were shipped to Columbia, Pa., in 1807. Reports of the anthracite coal trade are usually begun with the year 1820, when 365 tons (one for each day of the year) were shipped to Philadelphia from the Lehigh region. Before this, however, in 1814, a shipment of 22 tons was made from Carbon-dale, also to Philadelphia. It is probable that the actual production prior to 1820 was between 2500 and 3000 tons.

More than 50 per cent. of the total production of coal in the United States from 1814 to the close of 1906, or 3,540,000,000 tons, was mined in Pennsylvania. The anthracite production in that State amounted to 1,854,906,009 tons, and the bituminous output was 1,695,926,082 tons. Illinois ranks second, with a total production of 594,551,163 tons, and Ohio third, with 460,626,939 tons. West Virginia, although not coming into existence as a separate State until 1863, ranks fourth, with a total production in 44 years of 386,106,956 tons. Alabama comes fifth, with 150,483,856 tons, and Maryland sixth, with 142,073,920 tons.

The Indiana Manufacturers' Association, Indianapolis, has addressed a circular letter to its 700 members, asking for data to be submitted to its Executive Committee, preliminary to drafting an order that the Indiana Railroad Commission will be asked to adopt, providing for reciprocal demurrage. When the association presented the shippers' bill to the Legislature, it had a reciprocal demurrage clause but that was stricken out. The order reads: "If any patron elects the carrier shall enter into an agreement with him to apply the so-called average plan for the determination and settlement of car service charges, the basis of the average to be 48 hr.; fractions of days are not to be taken into account; a credit of one day in time to be given each car loaded or unloaded within 24 hr., such credit to be applied on cars detained more than 48 hr.; no car to be entitled to more than seven days' free time; balances to be closed at the end of each calendar month."

The plant of the F. B. McCrosky Mfg. Company, Meadville, Pa., was sold at receiver's sale on September 6 to a company formed for the purpose of taking over the property, the consideration being \$18,000. The new company will be known as the McCrosky Reamer Company, and will have largely increased facilities for manufacturing.

United States Manufacturers in Canada.*

BY EDWARD PORRITT.

The *Manitoba Free Press* of Winnipeg has published a statement that up to July 1, 1907, 130 American industrial plants—or rather plants owned by American capitalists—had been established in Canada. There are no official statistics by which the statement can be checked, but with a wide knowledge of industrial Canada, with an intimacy with Canadian industrial conditions that extends from St. John, Halifax, and Sydney on the Atlantic coast, to Winnipeg, I am disposed to accept the *Free Press* figures as correct. This establishment of branches of American industrial concerns in Canada has been going on almost from the time that the national policy was adopted by the late Sir John A. Macdonald and the Tories in 1879; and it has been proceeding at an accelerated pace since 1897, when the Laurier government adopted in toto, although modified by the British preference, the national policy of the Conservatives.

The First American Venture.

The earliest American concern to establish itself in Canada of which I have any information was the Ontario Rolling Mill Company of Hamilton. The company was composed almost exclusively of American capitalists; and its first managing director, C. E. Doolittle, was an American citizen when he established himself in Hamilton. But the Ontario Rolling Mill Company, unlike many of the American concerns which have established branch factories on the Canadian side of the line since 1896, was not associated with any then existing plants in the United States. A small group of American capitalists realized that there was a market in Canada for the output of a merchant rolling mill; that the Canadian market was amply protected by the tariff of 1879; and they accordingly associated themselves in the enterprise at Hamilton.

Most of the American concerns which have been established in Canada since 1896 are, however, offshoots of long established firms in the United States—such, for instance, as the bridge building and structural steel company which for several years past has been established at Walkerville, near Windsor, Ontario—and they have installed plants on the Canadian side of the line in order to be in a better position to hold Canadian trade, no matter what changes may be made in the tariff and in the patent laws.

Most of Them Are in the Metal Industry.

As far as my observations go I should say that at least three-fifths of the 130 American firms now on the Canadian side of the border are in some branch of the metal industry; and that perhaps half of the remaining two-fifths are lumbering and woodworking firms which were compelled to establish themselves in Ontario, when in December, 1897, the government of that province so amended the regulations concerning the cutting of timber on Crown lands as to prevent saw logs from being carried across the lakes to the centers of the lumbering and milling industry in the State of Michigan.

It was the lumbermen of Michigan who had induced Congress to impose the high duties of the Dingley act of 1897 on sawn lumber from Canada; and it was in retaliation for these high duties that the provincial government at Toronto remodeled the code of regulations governing leases of timber limits on Crown lands. It is only necessary to go into the Georgian Bay country to realize how this new policy of the Ontario government has affected the lumber industry to ascertain what effect it has had in compelling American lumbering and milling companies to manufacture in Ontario; and to realize that it accounts for quite a large number of American industrial concerns which have established themselves in Canada during the last 10 years.

Nearly all the American concerns that are in the iron and steel industry, or in some other branch of the

metal trade, are engaged in the later stages of the industry. I can name several plants at the primary stage of the iron and steel industry that were either promoted by Americans or in which Americans still hold a controlling amount of the capital stock. But I do not know of a single iron and steel plant at the primary stage which is a branch of an American company.

The largest steel plants in Canada—those at Sydney, N. S., and at Sault Ste. Marie, Ont., were both American promotions. The Dominion Iron & Steel Company, at Sydney, was launched by promoters from Boston and New York. The Algoma Steel Company at Sault Ste. Marie was a Philadelphia promotion. The new plant which has just gone into service at Welland, Ont.—that of the Ontario Iron & Steel Company—is financed by Buffalo capitalists, while that of the Manitoba Rolling Mill Company at Winnipeg, which was got to work a little later this summer than that at Welland, is operated by capitalists who have their headquarters at Erie, Pa. But not one of these concerns is affiliated with existing iron and steel companies in the United States. Although they are all American promotions they are in every respect independent companies; and as regards at least the Dominion Iron & Steel Company its bonds and its preferred and common stock are now largely held in Canada, and are chiefly traded in on the stock exchanges of Montreal and Toronto.

Not Branches of American Concerns.

None of the larger American companies engaged at the primary stage of the iron and steel industry, or at even such later stages as the manufacture of steel rails, plates and structural steel, has as yet established furnaces and rolling mills in Canada; chiefly because as regards steel plates and the larger descriptions of structural steel, they have had to meet no Canadian competition. There is a great demand for these descriptions of steel in Canada. It is a demand that has grown enormously during the last six or seven years with the use of steel in the construction of office buildings in the Canadian cities, and with its much newer use in the construction of grain elevators at the lake ports.

The unprecedented activity in railroad construction of the last four years has, moreover, largely increased the demand for steel for bridge work and for steel rails. But so far American concerns have been able to get a fair share of the rail business, and most of the business in heavy sizes of structural steel and in steel plates without establishing themselves in Canada.

Now and again in recent years a large order for structural steel for use in Canada, well in the interior, has gone to firms in England. As recently as July 19 a contract of \$54,000 for a steel superstructure for the municipality of Toronto went to the Cleveland Bridge & Engineering Company of Darlington, in the County of Durham. Water pipes for municipal service are also still largely imported from Glasgow; and when there has been any barge building at the Nova Scotia ports, the orders for steel plates have gone to England or Scotland. Generally speaking, however, the bulk of the importations of heavy iron and steel are from the United States, and American concerns have so far secured and held this business without establishing plants in Canada.

All the American concerns in the iron and steel industry in Canada are engaged at the later stages; most of them in the manufacture of machinery or parts of machinery of one description or another.

The Influences Which Promote the Movement.

The high tariff is not the only reason that accounts for the advent of these American concerns in Canada. Since 1900 there have been clauses in all the railroad subsidy acts passed by the Dominion Parliament calling for the use of equipment made in Canada in connection with these subsidized railroads, and in 1903 there was an amendment to the patent laws of the Dominion by which manufacturers of patented machinery are compelled to manufacture in Canada.

This enactment of 1903 has been almost as instrumental as the tariff in compelling American manufacturing companies to establish branch plants in the Dominion. In many instances it has been much more effective, much more prompt in its action, and there can be no

* Condensed from an article in the *Boston Transcript*.

doubt that it has greatly accelerated the movement that can be dated back to the tariff of 1879.

Almost as soon as the Liberal Government came into power in 1896 Canadian manufacturers assured themselves that as regards protection and bounties they were as safe with Sir Wilfrid Laurier as Premier and Mr. Fielding as Minister of Finance as they had been with Sir John Macdonald as Premier and Sir Leonard Tilley or George E. Foster as Dominion Minister of Finance. Canadian manufacturers have lost absolutely nothing by the change of 1896 from a Conservative to a Liberal government. As regards the tariff schedules, except in the case of a few isolated and small industries that may under the preference have to meet with a little keener competition from Great Britain, Canadian manufacturers are practically where they were.

With high prices and ad valorem duties their tariff protection is higher than ever before, and they also have to thank the Laurier government for a bounty system which is prodigal in its liberality; for such expedients for reducing imports as the "made in Canada" amendments to the railroad and patent codes; for an extraordinarily high tariff barrier against Germany, and for the antidumping clause, first introduced into the tariff in 1904, and extended in operation by the tariff of 1906-07. Canadian manufacturers after the tariff of 1897—the first tariff for which the Liberal government was responsible—soon had their confidence in the permanence of the protectionist system fully restored. They were less than a year in getting completely over the apprehensions they had entertained when the Laurier government came into power in 1896. They have never since had the least cause for uneasiness; and this abundantly renewed confidence of the Canadian manufacturers soon extended to manufacturers in the United States doing any considerable business in Canada.

This new confidence among American manufacturers—this feeling that the protectionist system was not in the least danger under a Liberal government, notwithstanding the hostility of the Liberals during their 17 years of opposition to protection in any shape or form, had an appreciable effect in bringing about the establishment of branch factories of American concerns in Canada. The new regulations as to the manufacture in Ontario of all lumber cut on Crown lands—the order in council of the provincial government at Toronto in 1897—also greatly helped to the same end as regards the lumber and wood-working industry.

The New Canadian Patent Law Most Decisive.

But perhaps none of these governmental actions was more decisive than the amendment to the patent laws in 1903. It is this new law that accounts for the number of branch factories of Connecticut manufacturing concerns now in Ontario and Quebec. All the world knows that more patented machinery and patented appliances are made in Connecticut than in any other State of the Union; and it is obviously the law of 1903 that has caused so many Connecticut concerns to establish themselves in Canada.

American manufacturers of typewriters, of cash registers and of other high grade machinery now have their branch factories in Canada. Some of the branch establishments are not factories in the full meaning of the word. They are merely shops at which parts of patented machines are assembled; the parts being imported from the headquarters factory in the United States. But assembling of parts in this way has so far been accepted by the Dominion Government as compliance with the amendment of 1903 to the patent laws; and these assembling shops are counted among the American concerns which are established in Canada.

I have spoken of most of these American factories as being engaged in the iron and steel and other metal industries. While that is so, it is curious that so far the brass industry of the United States is not represented in this movement into Canada. Brass parts from the United States are sent into Canada for assembling; but there are only two brass factories in the Dominion and these are independent Canadian concerns.

There are American firms engaged in the manufacture

of paints and varnishes which have branch factories in Canada. American glass and pottery firms are similarly represented, especially in the Province of Quebec, and at Welland there is a large binder twine factory of which the headquarters plant is in Massachusetts. A few other miscellaneous industries are also included in the 130 American plants in Canada. The American textile industries have no representation among them, with the exception of a duck mill or two. All the cotton factories in Ontario, Quebec and New Brunswick are owned or controlled by one of the three companies which have their headquarters in Montreal, and in which the money embarked is almost exclusively Canadian. It is the same with the woolen industry in Ontario, Quebec and Nova Scotia. All the woolen factories are Canadian. As far as I can ascertain American concerns have no representation in the boot and shoe industry; although until the duties on the better grades of shoes were increased by the tariff of 1907 Massachusetts and St. Louis shoe manufacturers did a large and increasing trade in specialties in Canada.

The American paper making industry also is not represented among these international plants. But American paper making companies, especially those using wood pulp, may have to poise the procession across the boundary line if they desire to hold their oversea trade—to retain the business which they now hold in Great Britain, in South Africa and in Australasia. It is not improbable that they will be impelled northward somewhat in the same way as the Michigan lumbermen were compelled to set up sawmills and other woodworking factories in Ontario.

Largely Located in Ontario.

As to the geographical distribution of these existing 130 American branch factories in Canada, my estimate is that at least five-sevenths of them are in Ontario; and it is not difficult to account for their establishment in this province. Ontario has always been the industrial province of the Dominion. As soon as there is news that an American company is contemplating a Canadian factory, municipal authorities in Ontario chase after the proposed newcomer to Canada, much as a real estate agent in a boom town runs down and stays by a prospective customer for a house or a building lot, with the result that the newcomer from industrial America can set the terms of one municipality against those of another and can practically intimate that he is putting himself up for the highest bidder.

In these growing times in Canada scarcely a week goes by in which the Toronto daily newspapers do not record some new instance or some new development in this system of municipal largesse to industry. The system had its beginnings in Ontario about 1872 or 1874. But years ago it was adopted in the provinces of Quebec, Nova Scotia and New Brunswick.

At Hamilton there is a large wire drawing and wire working factory that is indirectly an offshoot of a much larger but similar plant at Warrington, Lancashire, that is famous for its product all over the world. But the Hamilton plant was never in any sense affiliated with the plant at Warrington. It is entirely independent, and was started 30 or 40 years ago by a member of the family at Warrington which for nearly a century has been prominently identified with the Lancashire wire trade. The wire working factory at Hamilton is the only iron and steel plant in Canada which, so far as my knowledge goes, can claim any English connection.

While the Italian Lloyds' transatlantic steamer Princess Yolanda, 12,000 tons, the largest emigrant ship ever built in Italy, was being launched September 22 at Riva-trigoso, near Spezia, it heeled over, rushed into the sea on its side and sank. There were many workmen on board, and they were rescued with difficulty.

The armored cruiser Edgar Quintet was launched at Brest, France, September 22. It is of 14,000 tons displacement, is expected to develop a speed of 23 knots an hour, and will cost when completed about \$6,400,000.

The Common Law on Strikes.

A Summary of Court Decisions on Labor Troubles.

The twenty-first annual report of the Commissioner of Labor, which deals with strikes and lockouts in the United States in the years 1881 to 1905 inclusive, has been issued recently and is an octavo volume of 979 pages. One of its most interesting features is a digest of the principal points of the common law applicable to strikes and their related labor difficulties. The report says: "Not all of these can be looked upon as definitely settled, since diverse rulings are to be found on some of the points discussed, and the courts differ considerably in the application of these rather general principles to individual cases; but this summary is believed to be in accord with the general trend of the decisions of the State and Federal courts." The summary is reproduced below:

Strikes.

By the term "strike" is commonly understood a concerted and simultaneous quitting of work by employees to influence the action of the employer in respect of some disputed matter, usually affecting the conditions of employment. A lockout, on the other hand, is the simultaneous discharge of all or a group of employees, or a refusal of the employer to permit them to labor because of such dispute.

In some early cases it was held that any concerted agreement to raise wages amounted to a criminal conspiracy, for participation in which the parties might be indicted. (*R. vs. Mawbey*, 6 T. R. 628.)

As construed in this country at the present time the common law does not condemn the strike. "The right to strike for any cause or no cause is clearly and fully sustained by all authority. Even a conspiracy to strike, followed by legal damage, is not unlawful if formed to better labor conditions." (*Allis-Chalmers Co. vs. Iron Molders' Union No. 125*, 150 Fed. 155.)

An agreement among strikers to take peaceable means to induce others to join the union and strike, or to remain away from the works of the employer until he yields to the demands of the strikers, is not a conspiracy; nor is the carrying out of such a purpose by peaceable persuasion and without violence or intimidation unlawful. (*Karges Furniture Co. vs. Amalgamated Woodworkers' Local Union*, 165 Ind. 421; 75 N. E. 877; *Union Pac. Ry. Co. vs. Ruef*, 120 Fed. 162.)

Picketing.

Peaceable picketing, or the placing of watchers about the works and on the approaches to them for the purpose of gaining information and of informing prospective employees as to existing conditions, or of persuading workmen willing to be approached to refrain from working, has been held to violate no tenet of the common law. (*Fletcher Co. vs. Int. Assn. of Machinists*, 55 Atl. 1077; *Pope Motor Car Co. vs. Keegan*, 150 Fed. 148; *Allis-Chalmers Co. vs. Iron Molders' Union*, supra.) In the case last named, however, it was said that peaceful picketing, while theoretically possible and entirely lawful, "is very much of an illusion;" and all forms of picketing are discountenanced in some cases on the ground of its tendency to bring undue pressure to bear on third parties, thus producing a sort of coercion or intimidation. (*Otis Steel Co. Limited vs. Local Union of Iron Molders No. 218*, 110 Fed. 698; *Beck vs. Teamsters' Union*, 118 Mich. 497, 77 N. W. 13; *Vegetahn vs. Guntner*, 167 Mass. 92, 44 N. E. 1077, &c.)

The idea at the bottom of all such measures is that of compelling the employer to treat with his former employees now on strike and reinstate them in their positions on the desired conditions. This implies a sort of surviving claim on the positions vacated, a view that is expressly or impliedly condemned in a number of cases. (*Union Pac. Ry. Co. vs. Ruef*, supra; *N. Y., L. E. & W. R. Co. vs. Wenger*, 17 Weekly Law Bul. 306; *People vs. Wilzig*, 4 N. Y. Crim. Rep. 403; *Pope Motor Car Co. vs. Keegan*, supra; *Crump vs. Com.*, 84 Va. 927, 6 S. E. 620.) The places vacated are to be freely open to any

one who may choose to accept them, and any interference by violence, intimidation, or threats with the constitutional right of another to labor when, where, and on what terms he pleases is illegal. (Ib.)

Boycotts.

The boycott is frequently resorted to as a means of enforcing strike demands. It may be defined as a confederation of persons for the purpose of injuring the business of another by preventing third parties from having dealings with him through fear of incurring the displeasure and hostility of the confederates. The boycott is directed not only at the person against whom the strikers had a grievance in the first instance, but against all who patronize him, with the intention of coercing him at the peril of financial ruin and social ostracism to comply with the requirements of the strikers. (*Purvis vs. Local No. 500, United Brotherhood of Carpenters and Joiners*, 63 Atl. 585; *Beck vs. Teamsters' Union*, 77 N. W. 13; *Barr vs. Essex Trades Council*, 53 N. J. Eq. 101, 30 Atl. 881.) Its legality has been denied in strong terms by some courts. (*Brace Bros. vs. Evans*, 3 Ry. & Corp. L. J. 561; *Thomas vs. Cin., N. O. & T. P. Ry. Co.*, 62 Fed. 803; *Casey vs. Cin. Typ. Union*, 45 Fed. 135.) In the last named case it was said that "No case has been cited where, upon a proper showing of facts, an unsuccessful appeal has been made to a court of chancery to restrain a boycott;" and in a recent case the boycott is defined as "an illegal conspiracy in restraint of trade." (*Walsh vs. Assn. of Master Plumbers of St. Louis*, 71 S. W. 455.) The restraint is illegal even though there be no threats or acts of violence and the withholding of trade be done only by members of an association, if there is actual coercion and intimidation, and even though such coercion is only the danger of incurring a fine imposed by a by-law of the association. (*Martell vs. White*, 69 N. E. 1085.) In *Longshore Printing Co. vs. Howell* (26 Ore. 527, 38 Pac. 547) and *Bohn Mfg. Co. vs. Hollis* (54 Minn. 223, 55 N. W. 1119), however, the boycott in itself was not condemned as illegal.

Black List.

Closely allied to the boycott, and often used as a part of its machinery is the black list, which is a list of persons who are "marked out for special avoidance, antagonism, or enmity on the part of those who prepare the list." (*Mattison vs. L. S. & M. S. Ry. Co.*, 3 Ohio Dec. 526.) A more common term among labor organizations is that of "unfair list," which includes the names of persons and firms from whom trade and intercourse are to be withheld. In such cases the legality or illegality of the maintenance and distribution of the "unfair list" would follow the conclusions of the courts as to the boycott of which it was an incident. As to the use of the black list by employers to prevent workmen from obtaining employment at other establishments with which the former employer is in association of some sort, it may be noted that a number of States forbid such action by statute. A mere exchange of information, leaving each employer free to act according to his own judgment in the case is not, in the absence of a statute, illegal. (*Willis vs. Muscogee Mfg. Co.*, 48 S. E. 177; *Boyer vs. Western Union Tel. Co.*, 124 Fed. 246; *Wabash R. R. Co. vs. Young*, 69 N. E. 1003.) Perversion of facts would give a right of action, however, as would any wrongful and malicious interference by a third person with contract relations existing between others, causing a breach thereof. (*Willis vs. Muscogee Mfg. Co.*, supra; *Joyce vs. G. N. Ry. Co.*, 110 N. W. 975.) The question was raised by the court in the latter case, though not answered, whether at common law such wrongful interference for the purpose of preventing the formation of contracts was not equally actionable, and *May vs. Wood* (172 Mass. 14, 51 N. E. 191), *Graham vs. Ry. Co.* (47 La. Ann. 214, 16 South, 806), &c., were cited as favoring that view.

Lockouts.

As to the lockout but little need be said. The right of the employer to discharge any or all of his employees who have no contract with him, or to refuse to employ any person or class of persons, rests on exactly the same footing as does the right of such employees to leave him or to refuse to work for him; it may be done for any

reason or no reason, and no redress at law or equity exists. (*U. P. Co. vs. Ruef*, supra; *State vs. Kreutzberg*, 90 N. W. 1098.) If a number of employers agree among themselves to refuse employment to designated persons or classes of persons, their action would be subject to review only to the extent indicated in the discussion of the black list, just above.

Injunctions.

Redress for injuries resulting from boycotting may be sought in an action for damages (*Boutwell vs. Marr*, 42 Atl. 607; *Martell vs. White*, supra); and money paid on demand of a labor organization to prevent a threatened strike is recoverable in an action on the case. (*Carew vs. Rutherford*, 106 Mass. 1; *March vs. Bricklayers' and Plasterers' Union No. 1*, 63 Atl. 291.) But inasmuch as the participants in a strike are generally numerous and are often not able to meet a judgment for damages if it should be secured against them, whether as individuals or as a union, cases of damage suits are not numerous. More common are proceedings in equity to procure injunctions to restrain picketing, boycotting, the distribution of "unfair lists" and other forms of coercion, intimidation, or interference with employment or business.

A preliminary or interlocutory decree may be issued at the instance of one party, who must show not merely possible or probable danger of interference, but that the injury is either already occasioned and will continue unless enjoined, or that it is so imminent as to warrant the intervention of the court. Other facts to be shown are the irresponsibility from a financial standpoint, of the parties against whom the injunction is sought; their numbers, making suits at law numerous and burdensome; and the preponderance of the threatened loss of the complainant over the inconvenience to the respondents which would follow the issue of the writ; though not all of these would be required in a single instance. (*My Maryland Lodge, No. 186, Int. Assn. of Machinists vs. Adt*, 59 Atl. 721; *Sherry vs. Perkins*, 147 Mass. 212, 17 N. E. 307; *Coeur d'Alene Consol. & Min. Co. vs. Miners' Union*, 51 Fed. 260; *In re Debs*, 158 U. S. 564, 15 Sup. Ct. 900; *Dudley vs. Hurst*, 67 Md. 44, 8 Atl. 901; *Brace Bros. vs. Evans*, supra, &c.)

The only force of an injunction is to maintain present conditions, and it has no power to procure the restoration of conditions already changed. Hence no injunction will issue relating exclusively to acts already committed. Neither will it issue to restrain the commission of criminal acts, unless such acts involve injuries to property or property rights for which the law does not afford redress. Where such injuries are threatened, however, an injunction will issue, even though the prohibited acts would be punishable as criminal. (*Sherry vs. Perkins*, supra.)

In its use in labor disputes the injunction is in general restrictive or prohibitory rather than mandatory. Thus while a railroad company may be ordered by a mandatory injunction to afford equal facilities for all freight offered it, its employees can not, by a similar injunction, be compelled to remain in its service. (*Toledo, A. A. & N. M. Ry. Co. vs. Pennsylvania Co.*, 54 Fed. 730.) Though if a workman remains with a railroad under the circumstances indicated, he will be liable for contempt if he refuses personally, after notice had, to carry out the provisions of the injunction. (*In re Lennon*, 166 U. S. 548, 17 Sup. Ct. 658.)

Where there is no adequate proof of intimidation or impending danger no writ will be granted, nor will mere persuasion and the offer of transportation from the locality where the strike is in progress, or the payment of strike benefits to those who will abandon their employment and join the union, call for the issue of an injunction, provided no coercion or intimidation is attempted. (*Johnston Harvester Co. vs. Meinhardt*, 60 How. Pr. 168; *Everett Waddy Co. vs. Richmond Typ. Union No. 90*, 53 S. E. 273; *Rogers vs. Evarts*, 17 N. Y. Supp. 264.) Actual violence is not necessary, however, to ground a successful complaint. The numbers of the striking employees, their positions, attitudes, looks, ridicule, threats, &c., may produce intimidation and coercion, against which an injunction will issue. (*Barr vs. Essex Trades Council*, supra; *Jordahl vs. Hayda*, 82 Pac. 1079.) Free use

of streets, free access to works, and freedom from insulting or otherwise objectionable treatment, both at home and in public places, are among the rights of every citizen; and an employer's interest in such rights for his employees is sufficient to support a complaint from him and the securing of an injunction on a proper showing of facts. (*American Steel & Wire Co. vs. Wire Drawers', &c., Union*, 90 Fed. 608, *In re Debs*, supra; *Jersey City Printing Co. vs. Cassidy*, 53 Atl. 230.) In general it may be said that what acts will warrant the interference of a court of equity will be determined by the attendant circumstances of each case rather than by any general rule; and in deciding the matter, the courts will consider the spirit and intent, and not merely the form and letter of the act or word. (*Coeur d'Alene, &c., Co. vs. Miners' Union*, supra.)

Labor organizations may be named as parties to proceedings for an injunction, whether incorporated or not. (*Loewe vs. California St. Fed. of Labor*, 139 Fed. 71; *Purvis vs. Local, No. 500, United Brotherhood of Carpenters and Joiners*, supra; *American Steel & Wire Co. vs. Wire Drawers' Union, &c.*, supra.) They may also be assessed for damages resulting from acts of members done under the directions or by the approval and consent of the union (*Purvis vs. Local, &c.*, supra; *Parker vs. Bricklayers' Union*, 21 O. L. B. 223; *Patch Mfg. Co. vs. Protection Lodge, No. 215, Int. Assn. of Machinists*, 60 Atl. 74), and may be fined for contempt of court, where injunctions prohibiting certain acts have been violated. (*Chicago Typ. vs. Franklin Union No. 4*, 36 Legal News 18; *Franklin Union No. 4 vs. People*, 77 N. E. 176.) A late case holds, however, that, in the absence of statute, neither fines nor damages can be assessed against an unincorporated labor organization, though it may be properly named in an injunction. (*Allis-Chalmers Co. vs. Iron Molders' Union No. 125*, supra.)

As to the binding effect of an injunction upon individual strikers and their liability both for damages and in contempt proceedings there is no dispute. Nor is it necessary to name as respondents all persons who may be subsequently held to be in contempt for a violation of the provisions of a decree, since all persons who have notice of its being issued and of its contents will be held to be bound by it. (*In re Lennon*, supra.)

Cutler-Hammer Lifting Magnets.

The Cutler-Hammer Company, Milwaukee, Wis., manufacturer of electrical controllers and other electrical machinery, has recently undertaken the manufacture of lifting magnets. That department of the business is conducted under the name of the Cutler-Hammer Clutch Company. The magnet, as now manufactured, is the result of many years of experimental work by the company's experts. The Donora Works of the Carnegie Steel Company was among the first to secure one of the new magnets, which was purchased more than six months ago, and although subjected to the severest tests is still in commission, and additional orders have been placed. A recent competitive test was made by the Youngstown Sheet & Tube Company. In this test magnets manufactured by prominent companies in the United States were used in unloading 109,350 tons of pig iron from a steel gondola. The Cutler-Hammer magnet did the work in two hours and three minutes, lifting on an average 739 lb. of iron each time.

The new magnet differs from those heretofore manufactured in the fact that, while the frames of the others are cast as a solid piece, that of the Milwaukee company has a central aperture through which the heated air may escape. Further radiation of the heat is afforded by having the frame corrugated. The magnet consists of a large circular iron shell, containing hundreds of feet of stripped copper coil, each turn being insulated from the other by asbestos. The coils are electrified by simply turning on the current, and when the magnet is ready to deposit its load all that is necessary to release it is to demagnetize the coils by turning off the current.

Alcohol for Operating Engines.

Official Tests of Internal Combustion Engines on Alcohol Fuel.

WASHINGTON, D. C., September 24.—A report upon an elaborate series of tests of internal combustion engines on alcohol fuel has been prepared for the Department of Agriculture by Charles E. Lucke, assistant professor of mechanical engineering, Columbia University, and S. M. Woodward, of the Office of Experiment Stations. A brief report upon a few preliminary tests was published some months ago, but the data obtained were so incomplete and inconclusive that the work was recently again undertaken on a much more comprehensive basis with results that will no doubt attract very general attention among power users. Through the courtesy of the Department, the correspondent of *The Iron Age* is enabled to present the following synopsis of this interesting report:

In Europe during the last ten years the high price of the petroleum oils used as fuel in internal-combustion engines has led to extended efforts to find other suitable and economical fuels. Among these alcohol has received much attention, and there have been manufactured and used in Germany a considerable number of engines especially designed for this fuel.

The question of a possible substitute for the petroleum fuels will become of increasing importance as time goes on. The supply of crude oil to be obtained in the United States must ultimately diminish, and the history of the past indicates that a constant increase in price of kerosene and gasoline may reasonably be expected. On the other hand, it is not unreasonable to hope that with improvements in agriculture and in processes of manufacture the cost of alcohol may fall, so that as regards cost alcohol may occupy a position of constantly increasing advantage in comparison with the petroleum oils.

Objects of the Investigation.

The objects of this investigation may be put under two heads: First, to determine whether the gasoline and kerosene engines at present on the American market can run on alcohol as fuel. This involved as related matters the determination of the manipulation to be followed in making the engines run on alcohol, the measurement of the relative maximum powers of the engines when using alcohol and the fuels for which they were originally made, and, lastly, the relative consumptions of the different fuels. Second, to determine, so far as the limited time and means available permitted, the improvements which might be desirable in the design of engines manufactured especially for alcohol.

Most of the engines used were loaned by their makers for the purpose of these tests. Each of the eight engines was run on alcohol as well as on the gasoline or kerosene for which it was designed. The engines used were:

- No. 1. A 15-hp. two-cylinder vertical four-cycle gasoline engine.
- No. 2. A 6-hp. horizontal four-cycle gasoline engine.
- No. 3. A 6-hp. horizontal four-cycle gasoline engine.
- No. 4. A 6-hp. vertical four-cycle gasoline engine.
- No. 5. A 6-hp. horizontal two-cycle kerosene engine.
- No. 6. A 40-hp. four-cylinder automobile gasoline engine.
- No. 7. A 40-hp. four-cylinder automobile gasoline engine.
- No. 8. A 2-hp. vertical two-cycle marine gasoline engine.

The last three, of course, were high speed engines.

On engine No. 1 15 tests are reported, giving the consumption of alcohol and gasoline under different brake loads and with different initial compressions.

With engine No. 2 24 tests are reported with gasoline and 30 tests with alcohol. These show the effect upon consumption and upon the shape and size of the indicator cards of changes in fuel, needle valve setting, time of ignition and brake load.

For engine No. 3 18 tests with gasoline and 19 with alcohol are given. These show the effect upon fuel consumption, mean effective pressure, and uniformity of explosions, of changes in brake load, needle valve setting, time of ignition and engine speed.

With engine No. 4 11 tests on gasoline and 26 on alcohol show the relative consumptions and powers with the two fuels under different settings of air and fuel

valves, and also the effect of heating the air in advance of its entrance to the carbureter.

With engine No. 5 four tests with kerosene and five with alcohol show the relative maximum power obtainable with the two fuels and the corresponding fuel consumptions. They also give some indication of how the fuel consumption is affected by different conditions of the engine's operation.

With engine No. 6 two runs on each fuel, gasoline and alcohol, show the relative power and fuel consumptions obtained with the two fuels.

With engine No. 7 12 tests with gasoline and seven with alcohol show the consumptions with different loads and with different valve settings.

On engine No. 8 10 tests using gasoline and seven using alcohol show the relative consumptions of the two fuels and the relative powers obtained under different adjustments of the engine.

Engine No. 1.

The engine is rated at 15 hp. at 280 rev. per min. It is two-cylinder, single-acting, vertical, four-cycle, 6½-in. bore and 10-in. stroke. Each cylinder has two valves set in the main casing. One of these valves is an exhaust valve, and the other an inlet valve for the mixture. Besides these two, there is another valve for the admission of fuel after it is gasified. This last-mentioned admission valve is operated from the main inlet valve stem by a projecting finger, allowing the fuel valve to be opened with the motion of the inlet valve or not, depending upon the governor action. When the speed rises too high the governor prevents this finger from coming in contact with the fuel valve stem. The carbureter is of the constant level overflow type, and is fitted with sight glasses, through which the fuel level may be observed.

Summary of tests: 1. The engine runs as easily and smoothly on alcohol as on gasoline, and probably more noiselessly on alcohol than on gasoline. 2. The usual gasoline carbureter may be used for alcohol, but with this carbureter the alcohol is not completely vaporized and passes into the cylinder partly in liquid form. 3. The maximum power of the engine is distinctly greater with alcohol fuel than with gasoline. 4. Higher compression may be used with alcohol for fuel than with gasoline. 5. The consumption of fuel per brake horsepower, whether measured by weight or by volume, was much greater with alcohol than with gasoline. 6. With either fuel it is very easy to use, through wrong adjustments, much more fuel than the minimum amount necessary. 7. High compression gives a slight improvement in fuel consumption, but this improvement may very easily be more than overcome by wrong adjustment of the fuel supply. 8. The lowest consumptions obtained were 0.71 lb. of gasoline and 1.12 lb. of alcohol per brake horsepower hour. 9. The highest working mean effective pressure obtained was about 90 lb. with both alcohol and gasoline, but at best consumption, the mean effective pressures, were materially lower.

Engine No. 2.

This was a horizontal, single cylinder engine, rated at 6 hp. at 300 rev. per min. The action is four-cycle, and the cylinder is 5¼-in. bore by 9-in. stroke, and water cooled. The compression, as determined by indicator cards, is 73 lb. per square inch. The engine governs by the hit-and-miss principle, but in a way quite different from that used in engine No. 1. The inlet valve is operated by suction and is not under control of the cam at any time. The exhaust valve, however, is a cam operated by a lever. When the speed gets too high the governor operates to prevent this valve from closing, and at the same time a finger prevents the inlet valve from opening. This will result in a miss stroke, and during the miss strokes the exhaust gases are drawn into and expelled successively from the cylinder, whereas in engine No. 1, during a miss stroke fresh air was drawn in

and passed out. The carbureter is attached directly to the inlet opening and is of the constant level overflow type, supplied by a pump.

Summary of tests: 1. With both alcohol and gasoline fuel, from half load to full load, the best consumptions were obtained with the smallest needle valve settings which could be used with the respective fuels and loads. 2. With both alcohol and gasoline fuel, by opening the needle valve the consumption could be increased to approximately twice the best consumption before the engine would be stopped by the excess of fuel. 3. With both alcohol and gasoline, the most rapid combustion, the highest mean effective pressure and the highest maximum pressure were obtained when the fuel used was considerably in excess of the best consumption. 4. With both alcohol and gasoline the amount of fuel used with any given load was approximately proportional to the needle valve setting. 5. The minimum needle valve setting for alcohol was about double the minimum setting for gasoline and about equal to the maximum setting possible for the same load with gasoline. 6. With alcohol fuel, using a slow burning dilute fuel mixture, the consumption was perceptibly improved by using a very early ignition. 7. The mean effective pressure and the maximum explosion pressure were about the same for both alcohol and gasoline at best consumption. 8. The highest mean effective pressures obtained with alcohol were appreciably greater than the highest obtained with gasoline. 10. Much more alcohol could be supplied to the engine cylinder than would be vaporized in the carbureter, so that liquid alcohol entered the cylinder. 11. With alcohol the engine would run on a greater range of misadjustment than with gasoline. 12. The best consumption results obtained were 0.69 lb. of gasoline and 1.23 lb. of alcohol, respectively, per brake horsepower hour. 13. At best consumptions the mean effective pressures were 90 lb. for both alcohol and gasoline.

Engine No. 3.

This engine is very similar to engine No. 2 in size, structure and method of operation, although its valve gear is different in details and the carbureter is quite different in action. This engine is single cylinder, horizontal, four-cycle, rated at 6-hp. at 340 rev. per min., cylinder diameter $5\frac{1}{2}$ in., and stroke 10 in. The compression as measured from indicator cards was 82 lb. per square inch. The engine governs by a method quite similar to the engine No. 2, by holding the exhaust valve open, the inlet valve being automatic suction operated. The carbureter, while it is of the constant level type, does not operate by a suction spray. In other words, the spraying orifice is below the level of the overflow a little over 1 in.

Summary of tests: 1. Variations of fuel consumption with different adjustments of the needle valve as found in engine No. 2 were confirmed. 2. Any opening of the mixture admission valve on miss strokes produced an appreciable waste of fuel. 3. Different indicator cards taken in succession vary greatly in shape and area, showing great irregularity in mean effective pressure. 4. Slow speeds gave a better alcohol fuel consumption than high speed. 5. Water injected into the exhaust pipe increased the consumption of alcohol fuel. 6. Very early ignition much improved the alcohol fuel consumption with the weak mixture used. 7. The best consumption obtained with gasoline was 0.85 lb. per brake horsepower hour. 8. The best consumption with alcohol fuel at 320 rev. per min. was 1.25 lb. per brake horsepower hour. A slightly better consumption was obtained at 200 rev. per min. 9. The mean effective pressure with both alcohol and gasoline fuel at best consumption was about 74 lb. Higher values were obtained with richer fuel mixtures.

Engine No. 4.

This engine is of the single cylinder, vertical type, with 6-in. bore and 8-in. stroke, rated at 6-hp. at 350 rev. per min. It is fitted with a throttle governor, designed for closer regulation than can be secured by a hit-and-miss governor. Liquid fuel is supplied, as in the other engines, through a pump about on a level with the shaft and in line with left hand flywheel hub. It rises through a pipe to the carbureter near the top of the cylinder, there entering the constant level chamber. Gasoline flowing

from this constant level chamber to the orifice is regulated by a needle valve, as in previous cases, and the flow is a weak suction flow, because the orifice is about $\frac{3}{4}$ in. higher than the constant level overflow pipe.

Summary of tests: 1. No entirely satisfactory gasoline consumption tests could be obtained, because the high compression of 128 lb. produced preignition and violent hammering. Short runs showed approximately the same gasoline consumption as other engines using lower compression. 2. The operation of the engine with alcohol was entirely satisfactory with this high compression. 3. The best alcohol consumption obtained was 1.13 lb. per brake horsepower hour. 4. As compared with the other engines tested, there was only a slight improvement in consumption, due to the higher compression used. 5. Any slight error in the regulation or adjustment of the engine would much outweigh the benefit of increased compression on the fuel consumption. 6. The maximum mean effective pressure obtained was about 97 lb. at best consumption. 7. With the air entering the carbureter heated to 125 degrees F., the engine would self-ignite with alcohol fuel. 8. This preignition caused no hammering in the engine cylinder, and was in no way objectionable in the operation of the engine. 9. With the air entering the carbureter heated to 150 degrees F., preignition took place so early as to reduce the maximum power of the engine, but otherwise it continued to run satisfactorily. 10. The use of heated air produced no appreciable change in the fuel consumption. 11. With the air heated to 125 degrees, the maximum mean effective pressure at best consumption was about 93 lb.

Engine No. 5.

This engine is designed for kerosene, whereas all the engines previously described are intended for gasoline. It is a single cylinder, horizontal engine, two-cycle, with crank case compression. The head-end compression, as determined from indicator cards, is 84 lb. per sq. in. It is rated at 6 hp. at 360 rev. per min., having a cylinder diameter of 7 in. and a stroke of 8 in. The engine has no carbureter, but is fitted up with a separate vaporizing chamber. Oil is supplied to a pump on top of the engine, which delivers it directly through a pipe to the vaporizer lip. This pump also has a hand-operated handle to deliver oil in starting.

Summary of tests: 1. To run the engine satisfactorily on alcohol it is necessary that the fuel-injection mechanism be slightly modified. 2. When properly arranged for alcohol, this engine can be started as readily and operated as satisfactorily on alcohol as on kerosene. 3. With kerosene it is absolutely necessary to keep the bulb cool by some means, and the steam injection satisfactorily accomplishes this result. 4. With alcohol the bulb tends to become too hot, and it would probably be advantageous to use some means for cooling it. 5. The maximum power obtainable from the engine with alcohol is greater than the maximum with kerosene. 6. The best consumption obtained with kerosene was 0.98 lb. per brake horsepower hour. 7. The best consumption obtained with alcohol was 1.60 lb. per brake horsepower hour.

Engine No. 6.

This engine is of the automobile type, four-cycle, single-acting, vertical, rated at 40-hp. at 900 rev. per min., each cylinder having $4\frac{3}{4}$ -in. bore and $5\frac{7}{8}$ -in. stroke. All of the valves are cam operated, and the carbureter is of the constant level type. This engine is the latest development of the works of the original developer of the high-speed engine. Gasoline enters the carbureter through a pipe, under a light pressure, obtained usually in automobiles by pumping air into the gasoline tank or by connecting the tank with the exhaust pipe by small pipe and check valve, thus regulating the pressure in the gasoline tank without the use of an air pump. The operation of this engine was so unsatisfactory that no summary of tests is submitted therefor.

Engine No. 7.

This engine has four cylinders, each of $4\frac{5}{8}$ in. bore and 5.3-16 in. stroke, and is rated at 40 hp. at 900 rev. per min. The engine has a cam operated exhaust valve and automatic suction inlet valve, in this respect being different from engine No. 6. It is also different in having

jump spark ignition instead of make and break and ignition, but these are matters of very little importance on the relative performance of gasoline and alcohol fuel. Gasoline enters this carbureter, as in previous cases, by way of a float chamber, which controls the level of the gasoline, and from the float chamber to a spraying orifice controlled by a needle valve shown in the cross section. There is, as in the carbureter of engine No. 6, a sliding throttle, with opening arranged with respect to the spraying orifice. The amount of gasoline spray is regulated by the needle valve having a fine taper and is otherwise dependent upon the vacuum in the carbureter chamber.

Summary of tests: 1. As satisfactory operation of the engine and as high a power was obtained when the engine was running on alcohol fuel as when it was using gasoline fuel. 2. When alcohol was used, but a small proportion of the liquid was vaporized in the carbureter. The remainder of the fuel supplied must have been carried along with the air as a liquid spray. This was shown by the low temperature of the fuel mixture after leaving the carbureter, and also by the fact that at low loads not all the cylinders could get an explosive mixture. 3. The fuel consumption per brake horsepower hour was increased by opening materially either the fuel needle valve or the throttle valve beyond the settings necessary to carry the load. 4. With gasoline fuel the consumption per brake horsepower hour did not appear to vary so much with the load as it did when alcohol fuel was used. 5. With gasoline fuel the best consumption was 0.69 lb. per brake horsepower hour. 6. With alcohol fuel the best consumption obtained was 1.30 lb. per brake horsepower hour at the highest load obtained—18 brake horsepower.

Engine No. 8.

This engine is a small boat engine, single cylinder, vertical two-cycle, rated at 2 hp. at 700 rev. per min., having a cylinder diameter of 4 in. and a stroke of 4 in. The carbureter is so attached that on every up stroke of the piston a mixture is drawn into the crank case. At the same time the compression charge is being compressed in the cylinder. The exhaust takes place through a port very similar to that of engine No. 5, and the moisture sucked in and compressed in the crank case is transferred from the crank case to the cylinder proper by a small port. The cylinder is water jacketed, and provided with a pump to maintain water circulation. Gasoline must be brought to this carbureter under a light pressure, as there is no gasoline pump. The carbureter is of the constant level type, the level being maintained by a float in the gasoline.

Summary of tests: 1. This engine was as easily started, and ran as smoothly and satisfactorily on alcohol as on gasoline. 2. The maximum power of the engine seemed to be greater with alcohol than with gasoline. 3. As the brake load in pounds is changed through a considerable range, the speed varies in the inverse manner so that the power remains nearly constant. 4. Much more fuel than the minimum amount necessary may be used by improper settings of the engine adjustment. 5. At full load the engine is very sensitive to slight changes in the conditions of ignition. 6. When alcohol fuel is used, if the crank case is cold, liquid alcohol collects therein, and may be subsequently vaporized as the crank case becomes hot. 7. The best consumption obtained on gasoline was 1.36 lb. per brake horsepower hour. 8. The best consumption obtained on alcohol was 2.52 lb. per brake horsepower hour.

Conclusions.

The following general conclusions are drawn as a result of the investigations reported in detail above:

1. Any gasoline engine of the ordinary types can be run on alcohol fuel without any material change in the construction of the engine. The only difficulties likely to be encountered are in starting and in supplying a sufficient quantity of fuel, a quantity which must be considerably greater than the quantity of gasoline required.
2. When an engine is run on alcohol, its operation is more noiseless than when run on gasoline. Its maximum power is usually materially higher than it is on gasoline, and there is no danger of any injurious hammering with alcohol such as may occur with gasoline.
3. For automobile air cooled engines alcohol seems

to be especially adapted as a fuel, since the temperature of the engine cylinder may rise much higher before auto-ignition takes place than is possible with gasoline fuel; and if auto-ignition of the alcohol fuel does occur no injurious hammering can result.

4. The consumption of fuel in pounds per brake horsepower, whether the fuel is gasoline or alcohol, depends chiefly upon the horsepower at which the engine is being run and upon the setting of the fuel supply valve. It is easily possible for the fuel consumption per horsepower hour to be increased to double the best value, either by running the engine on a load below its full power or by a poor setting of the fuel supply valve.

5. The investigations also showed that the fuel consumption was affected by the time of ignition, by the speed, and by the initial compression of the fuel charge. No tests were made to determine the maximum possible change in fuel consumption that could be produced by changing the time of ignition, but when near the best fuel consumption it was shown to be important to have an early ignition. So far as tested, the alcohol fuel consumption was better at low than at high speeds. So far as investigated, increasing the initial compression from 70 to 125 lb. produced only a very slight improvement in the consumption of alcohol.

6. It is probable that for any given engine the fuel consumption is also affected by the quantity and temperature of cooling water used, and the nature of the cooling system, by the type of ignition apparatus, by the quantity and quality of lubricating oil, by the temperature and humidity of the atmosphere, and by the initial temperature of the fuel.

7. It seems probable that all well constructed engines of the same size will have approximately the same fuel consumption when working under the most advantageous conditions.

8. With any good small stationary engine as small a fuel consumption as 0.70 lb. of gasoline, or 1.16 lb. of alcohol, per brake horsepower hour may reasonably be expected under favorable conditions. These values correspond to 0.118 and 0.170 gal., respectively, or 0.95 pint of gasoline and 1.36 pints of alcohol. Based on the high calorific values of 21,120 B.t.u. per pound of gasoline and 11,880 per pound of alcohol, these consumptions represent thermal efficiencies of 17.2 per cent. for gasoline and 18.5 per cent. for alcohol. But calculated on the basis of the low calorific values of 19,600 B.t.u. per pound for gasoline and 10,620 for alcohol, the thermal efficiencies become 18.5 for the former fuel and 20.7 for alcohol. The ratio of the high calorific values used above is, alcohol to gasoline, 1.66 by weight, or 1.44 by volume.

W. L. C.

Five Destroyers Contracted For.

Secretary of the Navy Metcalf on September 20 announced the awards of contracts for the construction of five torpedo boat destroyers, proposals for which were opened at the Department two weeks before.

Under the awards two of the boats will be built at the Bath Iron Works, Bath, Me., for \$624,000 each, two by the Wm. Cramp & Sons Ship & Engine Building Company, Philadelphia, for \$585,000 each, and one by the New York Shipbuilding Company, Camden, N. J., for \$645,000. In each case the boats will be constructed to the Navy Department's design as to hull and according to the builders' plans for machinery. They are to be equipped with turbine engines of the Parsons type, and must have a speed of 28 knots for four hours. The limit of time on their construction is 24 months.

The bid of Lewis Nixon to build a destroyer of 30 knots speed, using gas engines and deliver it in 18 months, was rejected on the ground that the proposal was irregular.

The Wm. B. Scaife & Sons Company, Pittsburgh, Pa., has been awarded the contract for furnishing the structural steel work and steel storage bins for the new plant of the Henry Cowell Lime & Cement Company, Concord, Calif. Eleven buildings will be required, involving about 2500 tons of structural steel.

Steam Versus Electric Locomotives.

The Steam Locomotive Capable of Still Greater Efficiency.

At a meeting of the New York Railroad Club in the building of the Engineering Societies, New York, September 20, Max Toltz of St. Paul, vice-president and general manager of the Manistee & Grand Rapids Railroad Company, read a most interesting paper in which he took issue with Lewis B. Stilwell and Henry St. Clair Putnam in an estimate they gave before the American Institute of Electrical Engineers last January, that "if all the railroads of the United States were to-day operated by electricity the aggregate cost of operation, which in 1905 amounted in round numbers to \$1,400,000,000, would be reduced by about \$250,000,000."

Economy of the Steam Locomotive, Properly Improved.

In undertaking to controvert this Mr. Toltz went into details pertaining to steam locomotives—namely: repairs and renewals of locomotives, engine and roundhouse men, fuel for locomotives and water supply for locomotives. In doing so he discussed at much length the value of superheaters and strongly urged their use. He sought to show that the steam locomotive properly improved is by far more economical than the electric locomotive, even taking it for granted that a kilowatt hour of electrical power could be furnished at the low figure of 6 cents at the bus bars and at 8 cents effective for traction as named by Stilwell and Putnam, who had further stated that a horsepower effective for a traction will cost 6 cents, of which 3.5 cents is for fuel when coal of 14,000 B.t.u. a pound costs \$3 a ton of 2240 pounds, and 2.5 cents is for other power-house supplies, power-house labor and maintenance of power-house equipment.

In analyzing the statements, Mr. Toltz computed the horsepower of 47,000 locomotives reported in service by the Interstate Commerce Commission in 1904 at 16,625,000,000, and said:

"The average freight locomotive is actually on the road not more than six hours in each 24-hour period and the same figure is approximately correct for the passenger locomotives. Assuming that each locomotive will develop during the six hours' work at every time 250 hp. (a very low estimate) the total number of horsepower hours per annum will then be nearly 26,000,000,000. In the reports of the Interstate Commerce Commission, 1905, it is also stated that nearly \$156,500,000 were expended on fuel for locomotives. Dividing this item by the total horsepower hours per annum would give a cost of 6 cents for fuel per horsepower hour, compared with the estimated cost of fuel of 3.5 cents as above mentioned when assuming the railroads are operated electrically. This former figure is practically correct because we know that on the average a steam locomotive will use 28 lb. of steam per horsepower hour. The average coal used in a locomotive boiler will evaporate about 6 lb. of water, which would necessitate 4½ lb. of coal per horsepower hour; at \$3 per ton of 2240 pounds will amount to 6 cents per horsepower hour. This, indeed, shows that more fuel per horsepower hour is being consumed in locomotives than in modern stationary plants which furnish power for electrical operation."

The Average Existing Locomotive Over 15 Years Old.

Mr. Toltz questioned the fairness of a comparison of an up to date power plant with the average locomotive. About 60 per cent. of the locomotives now in use were built, he says, over 15 years ago, are of the smaller type and cannot be worked as economically as the latest type, such as the Prairie, the four-cylinder balanced compound and the Mallet articulated compound with wide fireboxes. The reasoning for comparison should therefore, he urged, be made upon the basis of the latest type of locomotives and therefore he referred to the locomotive tests made during the World's Fair at St. Louis, which have established the fact that the coal consumption per horsepower hour was considerably less than 2½ lb. Yet to properly dissect the economy in the locomotives, he called attention to the fact that each

locomotive has one most economical speed limit, or, in other words, that on a given grade at a certain speed with a defined maximum load the locomotive will turn out the most work at the lowest cost.

In his conclusions, Mr. Toltz expressed the opinion that with the use of superheaters, smoke consumers and automatic stokers, the work of engine crews will be decreased in many respects. Less coal will be handled by the fireman, and in connection with perfect lubrication, the work of the steam in the cylinders will be greatly improved. There should be no blown out cylinder heads due to accumulation of water. Better and quicker starting of the train will be attained. Failures of non-steaming will be avoided by heating the feed water. There will be fewer leaky flues and fire boxes. Roundhouse labor on the boiler will be minimized, though the use of some coals, such as Illinois and Iowa, will require more attention to the cleaning of the smoke flue superheater. Fireboxes and flues will last longer, and last but not least, the curse of uncleanness, due to locomotive smoke, will be abated under conditions of perfect combustion in the firebox.

Total Cost of Improving Locomotives.

Estimating that the three improvements or devices can be added at a cost of less than \$4,000 a locomotive, Mr. Toltz figured that the total expenditure for 47,000 locomotives would be \$188,000,000 and this would be repaid within 22 months and 12.5 months respectively according to the following propositions, the percentages in the first being taken from the 1904 report of the Interstate Commission:

NO. 1.

30 per cent. of \$130,500,000 for engine and roundhouse men (2).....	\$39,150,000
39.2 per cent. of \$156,500,000 for locomotive fuel (3)	61,348,000
30 per cent. of \$9,150,000 for water supply (4)...	2,745,000

Total saving per year.....\$103,243,000

In this no account has been made for reduction of repairs and renewals, item (1).

Assuming that all existing locomotives are of the latest types using instead of 4¼ lb., only 2.6 lb. of coal per drawbar horsepower, as stated above, and are equipped with the saving devices, will resolve itself into the following:

NO. 2.

42.2 per cent. less coal for modern equipment.....	\$66,040,000
39.2 per cent. of \$96,460,000 (item 3), about.....	35,460,000
(\$90,460,000, \$66,040,000, \$156,500,000, total item 3.)	
30 per cent. of \$115,000,000 (item 1).....	34,500,000
30 per cent. of \$130,500,000 (item 2).....	73,635,000
30 per cent. of \$9,150,000 (item 4).....	2,745,000

Total saving per year.....\$177,880,000

The speaker declared that Stilwell and Putnam's statement relative to the reduction of the four items referred to when all roads are electrically operated, assumed a saving of

70 per cent. in item 1, repairs and renewals of locomotives:
50 per cent. in item 2, engine and roundhouse men;
50 per cent. in item 3, fuel for locomotives, and
100 per cent. in item 4, water supply for locomotives.

Accordingly, the savings would be as follows:

Item 1— 70 per cent. of \$115,000,000.....	\$80,500,000
Item 2— 50 per cent. of \$130,500,000.....	64,860,000
Item 3— 50 per cent. of \$156,500,000.....	78,250,000
Item 4—100 per cent. of \$9,148,000.....	9,148,000
A total of.....	\$232,758,000

In closing, Mr. Toltz said:

Huge Outlay Required to Obtain Doubtful Results with Electricity.

"The amount of capital which must be expended to obtain these doubtful results can hardly be imagined. A conservative estimate would be several billions of dollars. Although the estimated savings by an electrical equipment might warrant such an immense expenditure, the improvement of the steam locomotive offers like inducements. It has been the boast of the advocates of railroad electrification that with an electric locomotive double the trailing tonnage can be hauled at double the speed of the present steam locomotive. The writer begs to state that the steam locomotive of to-day (and not

the most powerful one yet built) takes 800 tons singly and 1600 tons doubly over a mountain grade of 2.2 per cent. with a speed of 10 miles per hour.

"The electric locomotive, either in single or multiple units, has its place in big terminals and in tunnels, but it cannot in its present development replace the steam locomotive for trunk-line service. The writer has investigated some of the greatest water powers in the Rockies and in the Cascades, and he ventures to say that none of them can deliver electrical power per drawbar horsepower per hour for less than 5 cents. Another feature over which most enthusiasts of electrification stumble is the high power factor which is assumed. If electrically operated to-day, the power factor would not exceed 48 per cent. on three typical American railroads: the Great Northern, Northern Pacific and Canadian Pacific. These are facts as Daniel Webster once said, which can invariably be proved, and it will therefore be a little time yet before our old standby, the steam locomotive, will be relegated to the scrap heap, if our fraternity will assist in making this old friend of ours what it should be."

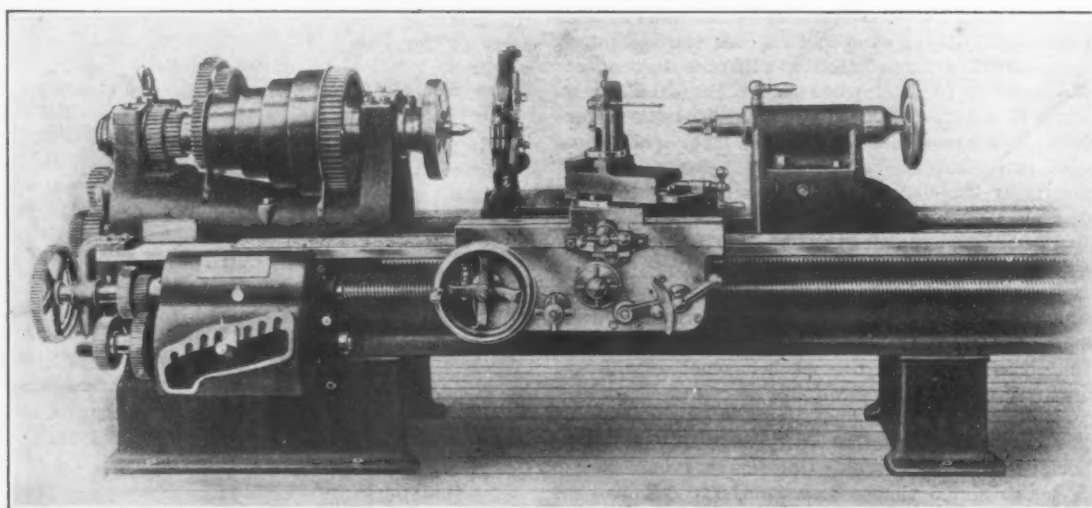
A New Heavy Pittsburgh Lathe.

Being intended for extremely heavy work, it is natural that the lathe illustrated exhibits as its principal char-

threads can be cut: 1, $1\frac{1}{8}$, $1\frac{1}{4}$, $1\frac{1}{2}$, 1 7-16, $1\frac{1}{2}$, $1\frac{3}{4}$, 2, $2\frac{1}{4}$, $2\frac{1}{2}$, $2\frac{3}{4}$, 27, 3, $3\frac{1}{2}$, 4, $4\frac{1}{2}$, 5, $5\frac{1}{2}$, $5\frac{3}{4}$, 6, $6\frac{1}{2}$, 7, 8, 9, 10, 11, $11\frac{1}{2}$, 12, 13, 14 and 16 per inch. The lead screw is of 40 carbon steel, 2 pitch, 1 15-16 in. in diameter, and is splined its length, so that the threads are used only for screw cutting; the lateral feed gear is feathered in the spline of the lead screw. The rack is solid steel, 1 3-16 in. face and 6 pitch. With the exception of the first friction gears, all of the driving gears in the apron are of steel. The shear nut is cut from the solid and all of the studs and spindles are steel. A patent device is provided in the apron to prevent conflict between feeds, *i. e.*, only one can possibly be thrown in at a time.

The carriage has a bearing on the ways $31\frac{1}{2}$ in. long, or its full length, there being no recesses in the bearing surfaces. It is gibbed to the bed its full length. The cross slide is fitted in a female way in the carriage, which it is contended affords the stiffest kind of construction. The compound rest is also of very stiff construction. All of its slides are scraped to a fit and are provided with taper bronze gibs having full bearing the whole length of the slides to take up wear. The cross slide is furnished with automatic cross feed.

The lathe has an actual swing of $28\frac{1}{2}$ in. over the ways and $20\frac{1}{2}$ in. over the carriage. The maximum distance between centers with a 10-ft. bed is 5 ft., and a lathe of that length weighs complete 8000 lb. The at-



A New 28-In. Swing Double Back-Geared Engine Lathe Built by the Pittsburgh Machine Tool Company, Allegheny, Pa.

acteristic very stiff construction. It is a 28-in. swing, double back geared engine lathe, built by the Pittsburgh Machine Tool Company, Allegheny, Pa., and has positive driven feed with a quick change gear box. The parts in which rigid design are particularly to be noticed are first of all the bed, which is wide and deep, and is provided with a cabinet base, the head stock, tail stock, carriage, cross slide and compound rest, and the apron. Wherever gears enter in, it will be seen from those that are exposed in the engraving, that they are of very wide face and coarse pitch, so that they may be strong enough to transmit the required driving and feeding power when taking extra heavy cuts.

The spindle is of 60 carbon steel and is of large diameter, 4 15-16 in. It is supported in bearings made of copper and tin (6 to 1), scraped to fit the spindle; the front bearing is $6\frac{1}{4}$ in. long. The cone pulley is also of large diameter, the largest step being 17 in. in diameter, and is made with either three or four steps, the former for a 5-in. belt and the latter for a $3\frac{1}{2}$ -in. belt. With the double back gears the three step cone affords nine changes of speed and the four step cone 12 changes. The back gear pinion is steel. The tail stock has an extra long bearing on the ways, 19 3-8 in., and contains a spindle of large diameter and a bronze nut.

All the gears inside of the feed box are cast steel, and with the changes which are possible the following

tachments furnished include a compound rest, a center rest and a follower rest, and a countershaft and wrenches are also supplied. The lathe is guaranteed to bore straight and face square within 0.0001 in. in 1 ft.

Another failure in municipal ownership is recorded at Knightstown, Ind., owing to bad management of light and water plants. The officials in charge of the electric light plant report that it is now running at a loss, and, in addition to this, the power is inadequate for the dynamos and a new engine is needed, with no money to make the purchase. In order to make a showing with the people, the original rates were made very low, and it develops now that taxes have been levied in order to keep the plant going and liberal loans also have been made from the general fund.

At Sheffield, Eng., a new method of annealing steel has been in use recently, the invention of Victor Stobie. A small producer gas plant is employed. The gas is led through recuperating chambers and air already heated to a high temperature is forced under pressure into the gas. It is claimed that high speed steels can be annealed without oxidizing or "scaling" the surface of the bars. The furnaces have a capacity of 12 tons of steel each. Coal consumption has been brought to 4 cwt. per ton of steel annealed.

A Handy Device for Machinists.

Machinists and others will find very useful a decimal equivalent and drill speed determinator now being gratuitously distributed by the Cleveland Twist Drill Company, Cleveland, Ohio. The two sides of the device are shown full size in the accompanying illustrations. It is substantially made of three heavy disks of celluloid pivoted together at their centers, so that they may be rotated with respect to each other.

The side shown in Fig. 1 gives the decimal equivalents of all the sixty-fourth parts of an inch. To determine the equivalent of any one of these fractions the smaller upper disk is revolved until the notch in it exposes the decimal corresponding to the required common fraction as found on the outer circumference of the larger middle disk.

On the reverse side, shown in Fig. 2, the outer circle of figures on the middle disk gives all the standard sizes of drills from 1 in. to 3 15-16 in., varying by sixteenths, and when the smaller disk is revolved until the notch



Fig. 1.—Decimal Equivalents of Parts of an Inch.



Fig. 2.—Correct Drilling Speeds for Standard Drills.

The Two Sides of a Souvenir Distributed by the Cleveland Twist Drill Company.

is adjacent to a given size of drill, the proper drilling speed in revolutions per minute is at once indicated for both ordinary carbon and high speed drills of that size when drilling wrought iron, machinery steel or soft tool steel. Instructions as to the correct feed per revolution for the various sizes of drills are given approximately on the small disk, and it is also explained how to determine by observation when the maximum rate of drilling is being obtained.

The device being easily carried in the pocket, may be kept always at hand, and the material of which it is made being easily cleaned and not easily injured, its period of usefulness should be very considerable.

Carl Eckman, an engineer representing the Swedish Government, has been in Milwaukee recently for the purpose of inspecting and gathering information relative to the car ferries which operate between Milwaukee and points on the east shore of Lake Michigan. The Swedish Government is planning to place a fleet of modern car ferries upon the Baltic to operate across that sea, a total distance of about 70 miles, touching at a German port.

It is reported that the Roding Works in Luxemburg have been admitted to the German Steel Syndicate. The plant is controlled by the Société Anonyme d'Ougrée of Maribaye, one of the Belgian steel works.

Chromite Produced in 1906.

WASHINGTON, D. C., September 24, 1907.—The output of chromic iron ore or chromite in 1906 exceeded the production of any year since 1902, according to the annual report of the United States Geological Survey, which has just been completed by A. J. Collier. Notwithstanding the increasing demand for this product, its output in the United States supplies but a very small percentage of the requirement, which is chiefly met by importations. The total domestic production of this ore in 1906, amounted to 107 gross tons, valued at \$1,800. It was mined by two operators in California and was used in furnace linings. In 1905 the production was only 22 tons, valued at \$375. The importations in 1906 amounted to 43,441 tons, valued at \$557,594, or somewhat less than the importations of 1905. These figures are exclusive of the quantities of chromium salts of various kinds imported during the year.

The mineral chromite is widely distributed both in the southeastern and the western parts of the United States, where it is usually associated with certain basic

igneous rocks, but there are few localities where it occurs in sufficient quantities to constitute an ore of chromium. In the States along the Atlantic slope no deposits of chrome ore are worked on a commercial scale, though it is probable that with the extension of railroad transportation some of the deposits will be exploited. Chrome ore is used principally in making ferrochrome alloys and for hardening steel, usually in combination with nickel in the manufacture of armor plates. It is also used extensively in the manufacture of chromium salts for pigments. All the product of the California mines for several years has been used in the crude state for linings of copper furnaces.

Extraordinary fluctuations have marked the production of chromite in the United States during the past 20 years. As long ago as 1886, 2000 tons, valued at \$30,000, were mined and marketed in California. In 1894 the quantity had risen to 3680 tons, valued at \$53,231. This was high-water mark and production steadily decreased until mining operations were suspended in 1897. They were resumed again in 1900, when 140 tons were produced, but the output has not since exceeded the record of 1901, which was 368 tons, valued at \$5,790.

The production of chromite in Canada has increased rapidly in the last few years, having risen from 900 tons, valued at \$13,000, in 1902, to 8750 tons, valued at \$92,100, in 1906. The prices reported for the Canadian product are somewhat lower than those in the United States.

W. L. C.

The Nature of True Boiler Efficiency.*

BY W. T. RAY AND HENRY KREISINGER.

The Steam Engineering Division of the United States Geological Survey, in conducting boiler tests for the purpose of determining the heat values of coal for steaming purposes, found early in its experiments that the results obtained would have but little meaning unless the boiler performance were subtracted or divided out so as to get the efficiency of the grate and furnace. The purpose of this article, which is largely an abstract from a bulletin prepared by the above named division, is to offer a few formulated laws governing the rate of heat absorption by boilers and to present the more important results of these experiments.

Heat Transmission.

Heat travels from any hot body only to bodies at lower temperature, therefore, any boiler can absorb only that heat which is above the temperature of the water in it; heat below this temperature will not flow into the boiler water and therefore is not available for absorption. Commercial boilers absorb only part of the heat which is available for them; the percentage of the available heat which is absorbed by the boiler is called the true boiler efficiency. This efficiency depends somewhat on the way the heat is presented to the boiler, but chiefly on the construction of the latter. The true boiler efficiency is then defined as the ratio of the heat absorbed by the boiler to the heat which is available for it, counting only that heat available which is above the temperature of the boiler water.

In any steam generating apparatus the heat is evolved by the burning of fuel in the furnace, and is then transmitted through the space and through the water heating plates into the boiler water. The path of the heat travel and the mode of the transmission are shown in the accompanying diagram.

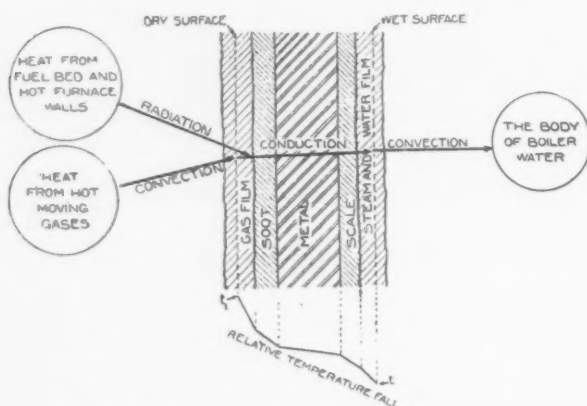


Diagram Showing the Path of Heat Travel from Source of Heat to Boiler Water.

In practice, the water heating plate of the boiler is always, to some extent, covered on the outside with a coating of soot, and on the inside with a layer of scale or mud. Just on the outside and entangled in the small recesses of the soot coating, is a dense film of gas which adheres to the solid. The density of this gaseous film decreases outward from the solid layer of soot. It is somewhere within this gaseous film where the dry surface of the water heating plate can reasonably be assumed to exist. There is a similar film of steam and water, adhering to the layer of scale on the inside of the boiler, which film can be considered to contain the wet surface of the heating plate.

In the diagram it is shown that heat is communicated to the dry surface of the water heating plate mainly in two ways:

a. By radiation from the hot fuel bed and furnace walls.

b. By convection from the moving gaseous products of combustion. By convection is meant here the process of displacing cold molecules from the adhering film of gas by hotter ones from the moving mass of hot gases.

From the dry surface of the heating plate, the heat is transmitted through the layers of gas, soot, metal, scale, and steam to the wet surface purely by conduction. From the wet surface the heat is carried into the body of the boiler water mostly by the convection of the circulating water. The retardation of any one of these three modes of heat travel lowers the efficiency of the boiler.

It has been said that the dry surface of the water heating plate may be considered as being somewhere in the adhering film of gas. This statement is more correct when it refers to the heat communicated by convection than to the heat imparted by radiation. In the latter case the greater part of the heat passes through the gas film directly to the soot, because gases are to a great extent permeable to the radiant energy.

As the adhering films of gas and the film of steam and water may be, and very likely are, of considerable thickness, the heat must pass through part of the thickness of the film by conduction, and as both the gas and steam are very poor conductors of heat, the resistance which these films offer to the passage of heat may be even greater than the combined resistance of the soot, metal and scale.

Rate of Heat Radiation and Conduction.

Although this paper is intended to discuss mainly the factors which influence the rate of heat impartation by convection, a brief explanation of the laws of the rate of heat radiation and the rate of heat conduction will help in making clear the whole matter of heat absorption by the boiler.

The quantity of heat which the boiler receives by radiation from any hot portion of the furnace or the fuel bed may be taken to be proportional to the difference of the fourth powers of the absolute temperatures of the hot parts of the furnace and the soot coating on the boiler plate. This law of radiation is known as Stefan & Boltzmann's law. Strictly speaking it applies only to black bodies; however, within the usual temperature range of the boiler furnace it can be applied to boiler problems without any serious error. It shows that the quantity of heat received by the boiler by radiation increases very rapidly as the temperature of the furnace rises. In boilers where the heat received by radiation is a predominant part of the total heat absorbed, the true boiler efficiency necessarily increases with the rise of the furnace temperature.

The quantity of heat which can be transmitted through a given unit of water-heating plate in a unit of time depends on the difference of the temperatures of the dry and the wet surfaces of the heating plate, and the conductivities of the substance between the two surfaces. For instance, if it is required to transmit double the quantity of heat in the same length of time, the difference of the temperatures of the two surfaces must be doubled. Since the temperature of the wet surface is nearly the same as that of the steam in the boiler and therefore can not be lowered, the temperature of the dry surface must be raised; as it is, this dry surface of the heating plate which cools the furnace gases, the rise of its temperature results in the rise of the temperature of the escaping gases. Thus we see that with the same conditions of the heating plate and the same initial temperature of the furnace gases, the temperature of the escaping gases will rise with increasing capacity, thereby decreasing the efficiency of the boiler in corresponding degree.

Surfaces of Heating Plates Should Be Kept Clean.

The main cause of unnecessarily great differences between the temperatures of the dry and wet side of the plate and the consequent high temperature of the waste gases is the presence of soot and scale on the surface of the heating plate. The heat conductivity of both of these substances is very low, which fact emphasizes the importance of keeping the surfaces as free from such deposits as possible.

* Abstract of a paper read before the Western Society of Engineers, Chicago, September 18, 1907.

The heat imparted to the boiler by convection forms in most cases a large percentage of the total heat received. It is therefore very desirable, for the sake of better boiler construction and operation, that the factors which influence the rate of heat impartation by convection be more thoroughly known. Excepting a few experiments done abroad and bearing only indirectly on the steam boiler problem, nothing has been done toward determining these factors. The Steam Engineering Division of the United States Geological Survey recently started the investigation of this problem, as an incidental feature in its regular work in testing the quality of coals for steaming purposes. These investigations consist of laboratory experiments made on small models of horizontal multitubular boilers. The laboratory methods and the small boilers were taken up because, first, it requires small outlay of money to conduct the experiments, and second, it is easier on a small laboratory apparatus to control all the conditions than it would be the case with a large boiler and furnace; it is necessary in work of this kind to keep all the conditions constant.

Results of the Geological Survey's Tests.

In the experiments thus made small multitubular boilers were used because of their simple form, and heat was generated by a miniature electric furnace in order to avoid the deposit of soot on heating surfaces. As the result of a large number of careful tests, one of the most important observations made was that the heat absorbed by the boiler per second varies almost directly as the calculated initial velocity of air. With the same initial velocity of air, tests with higher temperatures show a higher rate of heat absorption; but as the initial temperature of the air rises, the rate of heat absorption does not increase in proportion to the temperature, and it is therefore probable that when very high temperature has been reached there is little or no gain in the heat absorbed by further rise in temperature. This fact indicates that the rate of absorption is influenced by another factor, which varies inversely as the temperature; this factor is the density of the gas.

It was also demonstrated from tests conducted that true boiler efficiency drops at first very rapidly when the difference of drafts increases; but when the latter reaches a certain value, which varies with size of tubes and degree of temperature, the efficiency remains nearly constant. The small gradual drop noted in the efficiency beyond the point where the latter remains nearly constant may be accounted for by rapidly increasing capacity.

It was also noticed that a given difference of drafts pulled practically the same amount of air through two boilers in which the tubes, of same diameter, in the one were nearly twice the length of those in the other. This would seem to indicate that most of the resistance is at the entrance of the flues and very little of it in the tubes themselves, so that increase in the length of the flues increases the total resistance but slightly. Nevertheless, adding to the length of flues does not, when carried beyond a certain limit, materially increase the true boiler efficiency, for it was shown in a test that by doubling the length of flues a gain of only 8 per cent. in true efficiency was made. Further tests yielded results that would indicate the superior true boiler efficiency of the smaller diameter flues over those of the larger diameter.

Deductions.

The deductions drawn from these experiments, briefly summarized, indicate that:

a. After the velocity of gas parallel to the heating surface has reached a certain value the rate of heat absorption is almost proportional to the velocity.

b. The rate of heat absorption increases when the initial temperature rises; it also seems to vary directly with the density of the gas.

c. Increasing the diameter of flues decreases the efficiency of their absorbent power; increasing the length of flues beyond a certain limit increases their efficiency very little.

d. Most of the resistance to the passage of air through the flues is at the entrance into the tubes; the length of the flues increases the resistance but little.

The Page Woven Wire Fence Company.

The balance sheet of the Page Woven Wire Fence Company, of Pittsburgh and Adrian, Mich., of July 1, 1907, shows a surplus of \$1,088,469, against \$509,702, a year previous, the surplus having increased by more than \$500,000 during the fiscal year. The company has reduced its common stock from \$5,000,000 to \$1,000,000 by changing the par value from \$100 to \$20. The preferred stock remains at \$1,000,000, while the bonded debt is \$1,400,000.

A part of the increase in surplus is due to the cessation of dividends a year ago, this stoppage having been made for the purpose of accumulating a surplus. The addition to surplus in the last fiscal year, outside of the saving in dividends, amounted to more than \$250,000.

The company's rod mill has an output of about 200 tons of rods a day. About half of this is required for the company's fencing business, the balance being sold in the form of rods and wire. The company has outstanding contracts on these surplus products with various consumers, which contracts have about five years to run.

The company is adding to its open-hearth steel plant by which the ingot capacity will be about tripled. At present much of its steel is purchased in the billet form, but with the extension of the open-hearth department it will be able to supply nearly all its own steel requirements.

The Emery Steel Company.—The Emery Steel Company, Birmingham, Ala., recently incorporated with a capital stock of \$15,000, has leased the plant of the Weller Rolling Mill & Forge Company, at Gadsden, Ala., where it will manufacture open hearth steel bars, the intention being to put a considerable portion of the product of the mill into specialties, such as spikes and concrete reinforcing bars. The mill, which has a capacity of from 50 to 75 tons a day, is now being put in shape for operation, and the company expects to begin rolling by the middle of October or the first of November. In rounding out the equipment of the plant no new machinery will be purchased at the present time except the spike machines, the company having arranged for the few machines that will be necessary to complete the machine shop equipment. J. A. Emery is president and treasurer, and J. H. Pritchard, vice-president. The R. C. Foster Company, with headquarters in the Brown-Marx Building, Birmingham, and branches at Philadelphia and Savannah, and Augusta, Ga., has been appointed selling agent for the entire production of the mill.

Copper Production in 1907.—Statistics collected by the *Engineering and Mining Journal*, with the output of one producer estimated, show that the production of electrolytic copper in the United States in the first eight months of 1907 was 532,060,000 lb. It estimates that the production of Lake copper up to September 1 was 156,000,000 lb. At the same rate for the last four months of the year the production of electrolytic copper would be 798,090,000 lb., and of Lake copper 234,000,000 lb., a total of 1,032,090,000 lb., against 1,040,037,781 lb. last year. The same journal estimates exports in July and August at 60,000,000 lb. and puts stocks at 140,000,000 to 150,000,000 lb. on September 1, with an estimated increase to 180,000,000 lb. by September 15, which under ordinary conditions would not be considered enough to cause alarm. Crude copper in transit or in process of refining—usually two or three months' production in the case of electrolytic—is not considered in the above.

D. C. Newman Collins, consulting engineer and industrial architect, 29 Broadway, New York City, has recently issued a bulletin, which will be found of considerable interest and benefit to parties contemplating the erection of a manufacturing building, warehouse mill, or, in fact, anything in the way of an industrial plant. It is a treatise, going into detail on various classes of structures and the numerous kinds of materials and different methods employed in erection.

THE IRON AGE

1855-1907.

New York, Thursday, September 26, 1907.

Entered at the New York Post Office, as Second Class Mail Matter.

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						HARDWARE EDITOR.

Labor Questions in the German Iron Trade.

The common view of the average workman in the German iron industry is that he is more tractable and better satisfied than either British or American workmen in similar employment. At least, if not satisfied, he is not so apt to make a demonstration to better his condition. The picture generally drawn is that of a more or less paternal relation between employer and employee; of old age pensions, benefit funds and club features. Wages in many cases seem small, measured by the American standard; yet when purchasing power and accompanying benefits are considered they bear comparison with those in a good many British works. In fact, there is testimony from British workmen in opposition to the view spread abroad for political purposes in British manufacturing districts, that German workmen, as compared with those in Great Britain, live under conditions of social misery. A deputation of British wage-earners who were sent to Germany to investigate the situation published their reports early in the present year, giving the results of their visits to the chief iron and metal working centers of that country. Without going into details it may be said that on the whole these visitors found little room for choice as between British and German industrial conditions, granting that in view of differing nationality, traditions and habits, neither set of workmen would care to exchange its lot for that of the other.

It is surprising, therefore, in view of the testimony to the improved conditions attained by German workmen in recent years, to note the revolutionary proposal in regard to labor conditions that has recently been brought forward in the iron and steel trades. While heretofore there has been little or no assertion of union power in the German iron trade, the workers being for the most part unorganized, the unions have been gaining a foothold latterly. In the Rhenish Province and Westphalia, with a relatively small percentage of the iron and steel workers in their ranks, they have been agitating the introduction of an 8-hr. instead of a 12-hr. shift for blast furnace laborers. This proposal has been pressed upon the furnacemen of eastern Ohio and western Pennsylvania at intervals in the past few years, but never with much chance of success. With more pig iron being called for than the furnaces of the country could produce, it has been admitted by the men that a schedule that would suddenly require 50 per cent. increase in working force at every furnace was simply out of the question. The same problem has been encountered in Germany. The leaders of the workmen there compute

that 28,000 furnacemen are employed in the country; it would thus require 19,000 more men to operate the blast furnaces under 8-hr. shifts. This is not an insurmountable obstacle, it is said, but the workmen ask for the same pay for 8 as for 12 hr. The employers answer that the maintenance of Germany's position in the export iron and steel trade would be impossible with such a radical advance in labor cost as is involved in the evident programme to extend the 8-hr. shift to steel works and rolling mills. The present agitation gained its impetus from a Reichstag resolution passed in April for an inquiry into labor conditions at iron and steel works. The labor unions have been busy in Rhenish-Westphalia meantime, and it has been decided to make the blast furnace industry the special center of operations. Other questions which will be brought to the front are those of overtime work, the increase in accidents at iron works, hygienic conditions and the treatment of the men by their foremen.

Unquestionably the political tendencies in Germany will favor the present labor movement in the iron trade, the eventual outcome of which is likely to be some curtailment of the advantage in labor cost German works have commonly had over their British and American competitors.

Our Diminishing Balance of Trade.

The August merchandise imports and exports of the United States so closely approximated in value that the excess of exports was only \$1,833,352. This is the smallest balance of trade in favor of the United States that has been seen in many months. The exports of merchandise in August were the smallest in 14 months, while the imports ran slightly higher than the average for the preceding 11 months. The total value of the exports of merchandise was \$127,625,508 and of the imports \$125,792,156. The balance of trade in favor of the United States for the corresponding month of last year was \$24,104,453.

As the balance of trade in favor of this country in July was only \$3,817,569, against \$9,100,825 in the previous July, the August figures show that the relation between our exports and imports appears to be shifting and that their close approximation in that month was not merely due to some fortuitous trade development of a temporary character. This view is strengthened by a comparison of the excess of exports over imports for the months comprising the second quarter of 1907 and 1906, as follows:

	1907.	1906.
April	\$27,897,706	\$37,061,959
May	8,247,462	25,639,190
June	25,229,415	24,253,912
Average.....	\$20,458,194	\$28,985,020

The average monthly decline in the excess of exports for the three months thus covered was \$8,526,826.

These figures naturally attract the attention of those who are interested in the statistics of international trade movements. The question, how far the high prices of our goods are leading to falling off in foreign business and how far the higher figures at which certain articles have been sold, rather than the quantity of the articles placed on the market, has contributed to swell the total of exports, is also receiving a good deal of attention. The inference is drawn that our level of prices on general merchandise is too high and that reductions must be made if there is to be a return in this country to normal monetary and international trade conditions. On this point the New York Sun says:

"Our people as a whole must find out, just as it has been demonstrated in the financial district, that high

prices in a country, while having many advantages, yet make that country the poorest market to buy in and the best market to sell in; that continued extravagant living is not the way to accumulate wealth, and that there is such a thing as killing the prosperity of a country by the maintenance of an unduly high wage scale for labor."

The Machinery Lease Dying Out.

The lease as applied to the sale of machine tools, where customers of unestablished credit are unable to make cash payment, has largely fallen into disuse of late, partly because trade has been too good to permit of this class of business, but principally because the system is considered to have outlived its usefulness. Manufacturers and dealers agree that it is a practice which it would be better not to resume. In the past some houses have made the lease a conspicuous factor in their business, and probably all dealers have employed it to some extent. It was a part of the custom of long credits, which has gone out with better business methods.

Under the system as formerly operated, the customer with little cash and no established credit was given the machinery needed in beginning or enlarging his business. He paid part cash, usually one-third down, and the dealer retained title to the machine as security, the agreement being, by promissory note or otherwise, that payment should be made at stated intervals, with a year as the common date of final settlement. It was something after the order of the present day instalment plan as applied to retail trade, but no advance over regular prices was charged, and interest was at current rates. The dealer had the right to take back the machinery if the customer should fail to live up to his agreement. The original cash payment was supposed to cover depreciation of the machinery in case it should become necessary to take it back.

The dealer thus capitalized his customer's business. The sale was a loan secured by a lien on the machinery. The dealer's money was tied up instead of being available for turning over several times in the ordinary routine of business, and, of course, under ordinary conditions its earning power was reduced. The speculative element was conspicuous. The success of the customer starting in business was entirely problematical, otherwise his credit would have required no such security. If he succeeded unusually well in his first year he would pay the balance on his lease. But in many cases he failed to do so. Dealers hesitated about taking back machinery; in fact, rarely was the contract thus enforced if the customer remained in business. Payments dragged on year after year—a drain on the customer and showing an unsatisfactory profit to the dealer. Much of the machinery sold under these conditions was second-hand. The depreciation of the market value of a new machine is too rapid to render its sale advantageous in this manner. But the principle is the same, in whichever class of machines the money was tied up.

While the lease still has its place in the trade, it is to a comparatively insignificant extent and on a more consistent business basis. The contracts are for short terms, and there is a more rigorous insistence upon prompt payments. A three or four months' lease is executed, with one-third cash down and the balance in monthly installments. The credit then is no longer than that permitted in many other cases. The greater part of the machinery so disposed of is second-hand. The lease is also used to advantage with customers to whom the usual credit has been accorded and found unwarranted by conditions,

so that payment cannot be secured. The bills of sale for the tools are returned to the dealer and a lease is substituted, reinvesting him with the title. Machine tool builders used to do some business on leases, but to-day such a transaction is rare. Most of their business is through the dealers, and consequently they have little opportunity to come into so direct a contact with customers.

The recent extraordinary machine tool market has not been conducive to the continuation of the lease as a business custom, even for short terms and for second-hand machinery. To-day the temptation to dispose of some less desirable of the old tools in the storehouses might lead to a sale on this basis, on the theory that it would be better to take a part payment in cash, notes for the balance and a lien on the machinery, than to let the tools rest in the storehouse or on the store floor. Yet even under such advantageous conditions as these the custom cannot get a strong foothold again, according to the dealers. It is best that it should not. Modern competition does not often warrant the entrance into an industrial field of a concern so scantily supplied with capital that it cannot even pay for its machinery, for if business is conducted on a sound basis of costs and profits there must be a cash capital corresponding with the volume of business transacted. Too great a proportion of capital cannot be borrowed to financial advantage. A capital consisting largely of debt for equipment is a very different matter from a capital consisting of cash paid in for stock in the enterprise. Many make the mistake of thinking that a business can be built up from a shaky financial basis, but success under these circumstances is rare. Bundles of old leases, payments upon which have long been overdue, locked up in dealers' safes, have testified to the truth of this assertion.

The Protection of Employees from Usurers.

In spite of the legal barriers that in most States have been interposed to check the operations of usurious loan sharks, these modern Shylocks still manage to thrive on unlawful tribute wrung from indigent seekers for small personal loans. The wage earner or salaried employee, who through misfortune or other cause falls into their merciless clutches, finds them as relentless in exacting the pound of flesh as their ancient prototype. The stories of wrong, oppression and injustice wrought by these financial harpies in their pursuit of unfortunate victims is one of frequent recital in the daily press. It is in the larger cities that they ply their nefarious trade most successfully, and though their transactions are often clearly in violation of law they are extremely adroit in escaping conviction and punishment.

While sympathy for the individual victim is the strongest sentiment awakened by a consideration of this subject, it has another phase of collateral interest which, though lacking the blood stirring appeal to wrathful indignation naturally incited by oppressive injustice, is nevertheless important. This relates to the trouble and annoyance experienced by employers from garnishment or other legal processes instituted by these holders of obligations incurred by their employees. The pledging of prospective weekly or monthly earnings in whole or in part for loans at ruinous rates is a common practice and, though constituting a seemingly frail sort of security, it nevertheless gives the loaner a powerful hold upon his victim who, if he values his position, is naturally loath to have the transaction come to the knowledge of his employer. Whether led to the extremity of seeking such a loan by inprovidence or misfortune, the result is

generally the same. Interest accumulations finally make default of payment inevitable, and collection upon the wage assignment is then enforced. Aside from the trouble involved in the settlement of such claims, employers find that the efficiency of an employee, burdened with grinding obligations and harassed by the exacting demands of his creditor, is necessarily impaired. To this extent at least the business, therefore, suffers a direct loss in consequence of the loan sharks' operations. How best to meet the difficulties involved in the practice complained of is not easy of solution. Employers, whether as individuals or as firms and corporations, are generally willing to extend needed aid in the way of salary advances or direct loans to worthy employees; but at the same time it is recognized that indiscriminate liberality in this respect would only encourage the borrowing habit, promote improvidence and invite demoralization.

For the combined purpose of protecting their own interests and those of their employees, some large corporations have organized welfare associations to counteract the evils of the loan shark system. Various plans are adopted in the formation of these organizations, but in the main they are based upon co-operative effort in the creation and maintenance of a loan fund which is, under certain conditions, made available to worthy employees at current rates of interest. There is an obvious moral effect in this plan which cannot help but have a salutary influence of restraint upon extravagant tendencies and the creation of questionable debts. This is evident from the fact that applications for loans from this source would necessarily be closely scrutinized and would, therefore, need to be of a character that would bear investigation. On the other hand, if the employee should, under such circumstances, become involved through contracting obligations with loan sharks he could naturally hope for little sympathy or aid, and would rightfully be subject to dismissal. The question is one that is engaging the attention of some of the prominent corporations, and it is hoped that in the end measures will be generally taken that will effectually protect both employers and employees from the exactions of this class of notorious petty usurers.

The Eastern Pig Iron Association.—At the regular meeting of the Eastern Pig Iron Association, held in Philadelphia last week, a large attendance was reported. Investigation disclosed the fact that several of the stacks belonging to members of the association which have been in blast for long periods, would shortly be blown out in order to make extensive and long-needed repairs, in fact, one or two stacks have already been blown out, and others will follow very shortly. Some furnaces are being held in at considerable disadvantage in order to complete deliveries against contracts on which shipments must be made promptly. The long period of activity in the trade has resulted in many furnaces continuing to operate after the normal time for relining and reconstruction. It is quite natural, therefore, that the furnace owners should take advantage of the present conditions to make these repairs and get into shape for renewed activity.

A report made to Secretary Straus of the Department of Commerce and Labor by T. V. Powderly, chief of the division of information of the Bureau of Immigration, shows an immediate demand for the services of 256,400 men, women and children in various branches of industry throughout the country, at wages ranging from \$3 a week to \$3.50 a day. Commissioners of Agriculture in various States report that in the far West 1,020,000 settlers are needed, and the Department of Commerce and Labor is trying to meet these demands by the establishment of employment agencies for immigrants.

CORRESPONDENCE.

Radiation Pyrometers.

To the Editor: Robert S. Whipple, managing director of the Cambridge Scientific Instrument Company, informs us that he has written you a letter relative to the radiation pyrometer of Professor Thwing recently described in your paper.*

Visiting the steel and iron companies, as we do, we know that there is a great deal of interest in the metallurgical works in radiation pyrometers as well as in the thermo-electric. The latter pyrometer seems to be reasonably well understood in its principle but the former is understood by a very few merely because its principles have not been set clearly forth, and not because there is anything complex in either the principle or the operation of that type of pyrometer.

Leaving aside the question of merit of the Thwing instrument, there is no disputing the fact that the Féry radiation pyrometer was the first practical instrument of that type and that it is the only one as yet that is at all widely used. There appeared in the *School of Mines Quarterly*, April issue, a treatise on the Féry radiation pyrometer† by Frederick Maehlen, and the writer of this letter and Professor Féry have told us that it is both accurate and clear. We are sending you a copy under separate cover, which you may like to read, and as we have a number of reprints similar to the one being sent, we shall be pleased to send them to any of your readers who have an interest in the subject.

THE WILSON-MAEULEN COMPANY.

NEW YORK, September 14, 1907.

Slate Production in 1906.

Nine States, says the United States Geological Survey, reported a commercial production of slate in 1906—Pennsylvania, Vermont, Maine, Virginia, Maryland, California, New York, Arkansas and Georgia, named in the order of value of output. The production for 1906 was valued at \$5,668,346, as against \$5,496,207 in 1905, an increase in 1906 of \$172,139.

The production of slate for roofing is measured by "squares," a square being the number of slates required to lay 100 sq. ft. of roof, allowing a 3-in. lap. Since 1903 there has been a gradual decrease in the number of squares of roofing slate made in the United States, and a corresponding decrease in the value of the total product as well as in the price per square. This decrease is due to several causes, among them a decline in the export trade to the English market, where American slate found considerable sale for several years, but where it has been supplanted by the slate from Welsh quarries and by cheaper, small sized French roofing slates. Other causes of the decline are labor troubles in the building trades, strikes in the slate quarries and an increased use of roofing materials that are cheaper than slate or better adapted to flat roofs, which are now more generally used in cities.

The production of slate for milled stock—that is, for table tops, mantels, &c.—has been steadily increasing in quantity and value, the output for 1906 having been larger than for any previous year, its value being \$1,219,560, as against \$921,657, in 1905, an increase of \$297,903.

The Tidewater Steel Company held its annual meeting at Chester, Pa., September 18. The following directors were elected for the ensuing year: Evans R. Dick, J. Howard Moody, Joseph Gilfillan, George McCall, Charles A. Porter, Charles T. Schoen, Frank Samuel, Charles E. Stafford, and Frederick S. Hovey. The directors re-elected Charles E. Stafford president and Frank Dreizler secretary and treasurer. No proposition for a lease of the long idle plate mill was submitted, although a rumor of that kind had been in circulation. The furnace is leased to the Maryland Steel Company.

* The description of the Thwing pyrometers appeared in *The Iron Age* August 1, 1907, and Mr. Whipple's letter was printed September 19, 1907, page 734.

† An illustrated description of the Féry radiation pyrometer was given in a reprint of an address on "Thermometers and Pyrometers," by Robert S. Whipple, in *The Iron Age*, February 7, 1907.

Bare Aluminum Wire for Electrical Machinery.

The metal trade is becoming interested in a new phase of the competition of aluminum against copper in the electrical field. A German electrician, Robert Hopfelt, has discovered that bare aluminum wire may be used for winding magnet coils, solenoids, &c., in place of insulated copper wire, and that it has decided advantages over the latter in some important respects. It is based upon the well-known property of aluminum to become covered with a layer of oxide, even at ordinary temperatures, which, although hardly noticeable, offers such a resistance to the electric current that a potential difference of about 0.5 volt is required in order to break it down. The turns of the bare aluminum wire touch each other in the same manner as if the wire were specially insulated. It is clear that only the single layers of such a coil need to be insulated from each other by intermediate layers, as the potential difference between them is greater than that between adjacent turns.

Theoretical and practical tests made by prominent authorities have fully proved, among other things, the following advantages claimed for this invention:

1. An economy in cost of 40 to 50 per cent. as compared with insulated copper wires as hitherto used.
2. An economy of about 55 per cent. in weight.
3. A far greater safety in operation for many purposes; for instance, in damp places or places filled with gas, for electric railroads, crane motors, &c.

As aluminum oxide does not possess the property of coming off in thin layers, like the oxides of all other metals used for electric lines—for instance, copper, iron, &c.—it is claimed that this natural insulation is superior to all other insulations, such as india rubber, silk or cotton; also in regard to its durability and constancy at a high temperature. Aluminum coils will practically stand a temperature of more than 100 degrees C., provided the body of the coil and the intermediate layers be made of incombustible material.

Owing to the low conductivity of aluminum, which bears a ratio to that of copper wire of 1:1.7, the question as to the space required in using aluminum wire is of the greatest importance, especially for the construction of electrical machines. Calculations made in this direction have shown that aluminum wire up to a diameter of 1.3 to 1.55 mm. does not require a greater space than round copper wire covered with a double layer of silk or cotton, in spite of its greater volume.

When calculating aluminum coils it is also to be noted that the temperature coefficient of resistance of aluminum is only 0.36, which is about 10 per cent. less than that of copper wire. Besides, aluminum coils will cool down better than coils of insulated copper wire. Many tests have shown that, in order to attain the same temperature, an aluminum coil can stand an overload of about 20 per cent. more than a copper wire coil of the same capacity. Considering these facts, when calculating aluminum coils the conductivity as compared with that of copper is to be taken at 1:1.5.

These qualities of the aluminum coils, together with the incombustibility of the insulation, will probably also produce an alteration of the standards for dynamos, motors, &c., in that higher temperatures will be permitted for coils of aluminum wire.

As to the manufacture of the aluminum coils, the process is very simple. Coils mounted on spools are wound in the usual manner, with the only difference that intermediate layers are placed between the single layers (not turns), which should consist of hygroscopic material, such as asbestos or common hard paper or shirting tape of very small thickness. It is to be especially noted that, in order to prevent the passage of current from one layer to another, the intermediate layers should be a few millimeters wider than the winding of the coil, so as to overlap the end windings by 1 or 2 mm. on each side. It has been shown that the layer of oxide, forming the insulation of the wire, is increased by the action of dampness upon the coil in such a manner that several hundred volts are sometimes required in order to break

down the insulating layer. It appears from this that coils used in the open air, such as field coils for electric railroad or crane motors, coils of field telegraphs, electric bells, &c., are not affected by the dampness of the air or soil, if made from bare aluminum wire, but that such coils will, on the contrary, improve the more they are exposed to dampness.

It has hitherto proved to be a difficult process to solder aluminum wire, so that for each coil a single wire has had to be used. The inventor has succeeded in devising a simple and safe soldering process for aluminum wires, in which a direct union of aluminum with aluminum will be made by autogenous welding.

The Hopfelt invention is controlled by the Syndicate for Aluminum Coils, Ltd., of Berlin.

Ohio Canal Traction.

The Ohio Canal Traction Company, Cleveland, Ohio, recently incorporated with a capitalization of \$75,000, announces that in a short time it will place orders for six or eight canal boats propelled by 40-hp. gasoline engines for operation on the Ohio Canal. The boats will be of steel, 80 ft. long, and have a carrying capacity of 250 tons. It is expected that they will be ready for operation next spring. At first they will run between Cleveland and Akron, but it is the intention to operate them ultimately to Marietta, a distance of about 300 miles. Important towns on the route will be Massillon, New Philadelphia, Canal Dover, Uhrichsville, Dresden and Zanesville. The company intends to carry a general line of freight, but not to handle bulky freight as coal, lumber and ore.

The State has been at work for some time in rehabilitating the canal, which has been used but little during the past few years. A few days ago the State Board of Public Works and officials of Cleveland held a conference which may result in opening up a valuable water frontage tract for manufacturing purposes in Cleveland. From the point where the present river improvements stop, the canal and the Cuyahoga River run side by side for some distance. The canal prevents further dredging of the river. It is proposed that about a mile of the canal channel be diverted into the river, so that the river can be dredged and made navigable. If this is done a tract a mile long can be opened up for manufacturing purposes on either side of the river.

The committee on Constitutional Amendment of the National Metal Trades Association met at the Engineers' Club, New York, September 23 and 24. Those present were: H. N. Covell, Lidgerwood Mfg. Company, New York; J. C. Hobart, Triumph Electric Company, Cincinnati; S. K. Copeland, Sullivan Machinery Company, Chicago; John Kirby, Jr., Dayton Mfg. Company, Dayton, Ohio; President M. H. Barker, American Tool & Machine Company, Boston; J. H. Schwacke, William S. Sellers & Co., Inc., Philadelphia; Commissioner Robert Wuest, Cincinnati. A number of important amendments to the constitution and by-laws of the association were decided upon by the committee. These will be submitted to the membership of the association for ratification.

The New York Shipbuilding Company, Camden, N. J., September 21 launched successfully the steamship Princeton, intended for the People's Line, for use in Hudson River transportation. The Princeton is the third of a series of steam turbine passenger boats which have been built by this company for the Consolidated Steamship Company of New York. It is 440 ft. long, 95 ft. in breadth, and has four decks.

The Bucyrus Company, South Milwaukee, Wis., has decided to double the size of its steel casting plant, which now contains one 15-ton open-hearth furnace, annealing furnaces, core ovens, &c., and has placed the contract for this work with the Forter-Miller Engineering Company, Hartle Building, Pittsburgh, builder of the present plant.

The Tangled Railroad Rate Situation.

Railroads Too Busy Meeting Technicalities of the Law to Consider Necessities of Shippers.

BY R. L. ARDREY, CHICAGO.

The National Industrial Traffic League, organized recently at a convention of shipping interests held at Chicago, has undertaken the task of securing relief for the shipping interests of the country from serious difficulties that have arisen since the passage of the Hepburn law. This league is composed of practical traffic managers, representing shipping firms or industries, or employed on traffic work by associations of business men. Many of the largest companies in the iron and steel trade, and related industries, are active in the membership and directory. The president, J. C. Lincoln, is traffic manager for the Merchants' Exchange of St. Louis, and the secretary, E. B. Boyd, holds a similar position with the Board of Trade of Chicago. It might be said that the organization is an alliance of the iron and industrial interests of the East with the grain and commercial interests of the West.

The purpose of the league is to maintain an organization that will command the respect and confidence of the Government and the Interstate Commerce Commission, as well as of the public at large; and to secure attention for the practical side of shipping and traffic questions. The legislation of the past couple of years has increased rather than lightened the burdens of the shipper, chiefly because the interests of the men who carry on the business of the country have been overlooked in the popular agitation for legislative control of the railroads.

The Hepburn act precipitated upon the shippers a flood of difficulties and embarrassments which the Interstate Commerce Commission will require years to straighten out; and, owing to the fact that there is no practical traffic man on the commission, many of the rulings of that body, although conforming to the highest ideals of law, have increased the inequalities and discriminations which the law was intended to correct.

How the Through Rate Ruling Works.

One of the first acts of the commission, when it assumed the power a year ago to make rates, and rulings affecting rates, was to issue a declaration that when a shipment moves over two or more connecting lines, the published through rate, whatever it may be, should be the lawful rate; and making it unlawful for the shipper to take advantage of combinations or sums of locals. From time immemorial the railroads had given shippers the benefit of the lowest regular rates, whether through or sums of locals. For example, practically all the iron and steel moving from mills east of Chicago to industries west of Chicago, as far as the Mississippi, moved, until recently, at the sums of the locals. From Chicago west there was a commodity rate which, added to the class rate from the Eastern mills to Chicago, made a total which was generally 4 cents per 100 lb. less than ancient and forgotten class rates from the mills to these Western points. Similar conditions prevailed all over the country. Where there were two rates in effect, the shipper had the benefit of the lower one.

The ruling of the commission had the effect of reviving from the vaults of the "rate cemetery" at Washington thousands and scores of thousands of dead and forgotten through rates, sending them forth in their moldy cerements to point their ghostly fingers at the criminal penalties of the Hepburn act. No one has ever been able to explain why the commission did it. There was no question of rebates, discrimination or injustice involved, to call for the ruling. The legality of shipping at the sums of locals had never been questioned, and the railroads did not take the trouble to check up and cancel the accumulation of many years of these dead and abandoned rates. They need an army of expert rate clerks to look after their live rates, and during the year that has elapsed since the commission resurrected the

myriads of dead ones, they have only made a beginning toward getting the latter buried in proper legal form. Meantime, nearly every shipper in the country whose business is of any magnitude has been, technically, a criminal; placed in that position by an unnecessary act of the commission.

Shippers Are Technical Violators of the Law.

Shipping interests made strong protests against the ruling as soon as it came to their attention a year ago, and step by step the commission has been receding from its position, but in a very grudging and halting manner. The railroads are now permitted to file new through rates to replace the old combination of locals, on one day's notice to the commission; and the commission has also given the shipper a little comfort by declaring that when the through rate is higher than the sums of the locals it is *prima facie* unreasonable. But it is a slow and tedious process for the railroads to correct the multitude of discrepancies of this kind confronting them; and meantime the shipper who cannot do business to-day on the abandoned rate of 10 years ago must go on, committing a technical infraction of what the commission declares to be the law.

The National Industrial Traffic League, after full consideration of the matter at a meeting held in Chicago August 29, has decided to make another effort toward securing recognition from the commission of the fact that the sum of the locals is a lawful rate, and may be used whenever it is lower than through rates. The difficulty seems to be in convincing the commission that this right of the shipper will not be abused. The experts of the commission have found a few cases in the past, where local rates were framed up to give an advantage to some favored shipper; but it is safe to say that no corporation in the United States is now taking any risk of that kind, and there ought to be no difficulty in distinguishing between the legitimate use of long established local rates and any possible (and improbable) case of manipulation.

The 30 Days Delay in Naming a Competitive Rate.

The league is also seeking to have another serious trouble corrected. In the past every railroad stood ready to meet any legal rate which competing lines might have in force, whether it had a formally established rate of its own or not. Under the Hepburn act, a road cannot do this without complying with all the intricate formalities of filing the rate and waiting 30 days before it can be utilized. The league will ask the Interstate Commerce Commission to permit these competitive rates to be filed and take effect after one day. To statesmen or the public at large it may seem surprising that shippers would have trouble over a little matter like this; but it has proved one of the most difficult technicalities which the iron trade has had to surmount the past year. There are thousands of cases where only one road between two points has rates that have complied with all the formalities, and where the shipper may prefer to use some other line.

Another dangerous difficulty which will be brought to the attention of the commission is that the rulings now in force make the shipper liable, as well as the railroads, for mistakes or defects in a rate which the shipper knows nothing about. When a new tariff is filed at Washington, each road interested in joint rates that are named in it must file a formal concurrence. Often 10 or 20 roads are interested in a comprehensive book of rates, and a mistake or flaw in any of the documents makes the rate affected by it unlawful. If a rate is not properly indexed it is illegal; and the commission will not accept a new tariff, or recognize it as a lawful document, if the postage in transmitting it to Washington is a penny short. Notwithstanding his entire ignorance of any flaw or defect of this kind, and his utter inability to know whether all the requirements in making a rate have been complied with, the shipper becomes liable under the law when he makes use of a defective rate.

The Millions of Rates Covered by Tariffs on File.

There are some 3,000,000 tariffs on file in the vaults of the commission at Washington, and no one knows how many millions of rates are covered by these tariffs. It

would no doubt be very desirable if each of these rates could be hedged about with as many safeguards as the title to a piece of real estate, but it is impossible for a shipper to obtain an abstract of title with every rate that he uses in his business, so he might be assured that he had a legal right to use it. The law should not require any more of the shipper than that he should have the rate quoted to him, in writing or in a printed tariff, by the railroad which accepts his business. The publication or posting of tariffs at the stations of the railroads is a useless and unnecessary expense, for under present conditions one must become an expert before he can understand the complex tariffs which necessity compels the roads to issue.

The shippers who are interested in this movement hope and believe that the commission will accept and act upon advice from properly accredited representatives of the shipping interests of the country, who can show that they are seeking conditions which will enable them to comply with the laws of the land. It is generally believed that these difficulties have arisen from the failure of the shippers to keep their interests before the commission. The eminent commissioners have the greatest task on their hands that has ever confronted any body of public officials. Their first duty is to enforce the law, and everyone familiar with the situation believes that they are doing the best they can to perform their duties fairly and conscientiously.

From a legal point of view it is very easy to make the mistake of assuming that a rate is like a tax and should be hedged about with similar safeguards. Taxes, however, are paid but once a year, while rates are used every day by thousands of shippers, under conditions that are continually changing and requiring readjustments. The schedules of the Dingley tariff may be immutable, but railroad tariffs must have more or less flexibility, to adapt them to the necessities of the industries of the country. The rapid development of the industries of the United States in the past 50 years has been due in great measure to the fact that transportation rates have adjusted themselves from time to time, one might say automatically, to the needs of every section of the country. Incalculable harm will therefore be done if the traffic officials and rate experts of the railroads are kept so busy in complying with technical requirements of the law that they will have no time to think of the necessities of the shipper.

Labor Notes.

A Pittsburgh dispatch says that the United Mine Workers will protest against the admission to the United States of coal miners from England, Scotland and Wales, whom it is alleged agents of Pittsburgh district operators are bringing to this country on account of the scarcity of labor. The same dispatch says that in the Connellsville coke district the operators are endeavoring to secure 2000 English speaking men to take the places of Italians, Hungarians, Poles and Slavs. The foreigners observe so many holidays that work is seriously interfered with and it is the intention to displace them if possible. The Frick Coke Company employs over 25,000 foreigners.

The biennial convention of the International Association of Machinists, which has been in session at St. Louis, adjourned September 19. Denver was chosen as the meeting place for 1909. It was decided to take steps to affiliate all the metal trades before definite action to secure the 8-hour day. No radical action will be taken regarding the 9-hour day for railroad machinists since several roads have granted the shorter day and it is believed the change will be brought about by peaceable means. A change was made in the constitution by which the executive board will have all the powers of the grand lodge in the intervals of meetings. Beginning with next year, no local or general strikes can be declared without the consent of the executive board. It was announced that the New York officer of the union who had received \$10,000 a year for several years from

the Erie Railroad in return for immunity from machinists' strikes was suspended by the convention.

PERSONAL.

William A. Moore, who has been general manager since April 1 of the Nittany Iron Company, Bellefonte, Pa., has recently been elected its president. Mr. Moore's last previous work was in the Pocahontas coal field, where as general manager and constructing engineer for the Page Coal & Coke Company, he built in record time, the equipment for three large mines, 500 coke ovens, water works, electric light and power plant, 300 houses and about 12 miles of railroad. His election to the presidency of the Nittany Iron Company was due to achievements in many details of management in his short connection with that company.

Authoritative information has been received that the recently printed report is without foundation that John F. Lewis, assistant general manager of the Edgar Thomson Works of the Carnegie Steel Company, will be made general superintendent of the new steel plant at Gary, Ind.

A. G. Hinze, formerly connected with the Diamond Iron Works, Minneapolis, Minn., has accepted the superintendency of the Marinette Iron Mfg. Company, Marinette, Wis., having charge of mechanical operations.

D. B. Meacham, senior resident partner at Cincinnati, of Rogers, Brown & Co., returned from Europe last week.

J. W. Brophie, for the past two years master mechanic for the Atlanta Steel Company, Atlanta, Ga., has resigned to accept a similar position with the Ontario Iron & Steel Company, Welland, Ontario.

Max F. Abbé, president of the Abbé Engineering Company, New York, has just returned after a five months' stay in Europe, visiting England, Belgium, France and Germany.

OBITUARY.

HARVEY W. PEACE died September 21 at Whitestone, L. I., aged 77 years. He was born near Sheffield, England. His father being a maker of saws, the son learned the father's business. In 1849 the family came to America, locating in Brooklyn, N. Y. The son was then 18 years old, and with his father entered the employ of R. Hoe & Co. In 1861 Harvey started in the saw business for himself on Centre street, New York. In 1863 his business outgrew the small shop, and he secured a larger factory at the corner of Keep and Ainsley streets, Brooklyn, where the business was subsequently conducted by him under the name of the Harvey W. Peace Company. It continued under his personal direction for 30 years, until 1891, when he sold his plant, which was ultimately consolidated in the National Saw Company, and retired from active business life, to enjoy an ample competence. He leaves a widow, five sons and two daughters.

JOHN MOFFETT, superintendent of the Cornell Iron Works, New York, died September 18, at his home in Bayonne, N. J., aged 75 years. He leaves a widow and five daughters. He had patented several important engineering devices.

ROBERT A. BROWN, president of the New Haven Mfg. Company, New Haven, Conn., died September 23, aged 72 years. He had been connected with that company for 52 years, and had held the office of president for the past 31 years. He was not only widely known throughout the country from his connection with the New Haven Mfg. Company, but also with other industrial concerns, as well as with banking interests. He leaves a widow and three daughters.

S. FRANK FOX, Hartford, Conn., manager of the Hartford store of the Fairbanks Company, died September 21, aged 44 years. He was a native of Clarendon, Vt. He leaves a widow and two children.

Interstate Railroad Statistics.

The advance figures in this abstract are based on summaries in the nineteenth annual statistical report of the Interstate Commerce Commission, prepared by its statistician, for the year ending June 30, 1906.

Mileage.

On June 30, 1906, the report shows that the total single-track railroad mileage in the United States was 224,363.17 miles, or 6262.13 miles more than at the end of the previous year. The aggregate length, including tracks of all kinds, was 317,983.19 miles. Mileage of second track was 17,936.25; third track, 1766.07; fourth track, 1279.66, and yard track and sidings, 73,760.91.

The number of railroad corporations for which mileage is included in the report was 2313. During the year railroad companies owning 4054.46 miles of line were reorganized, merged, or consolidated. The corresponding figure for the year 1905 was 3802.02 miles.

The report shows that for the year ending June 30, 1906, the mileage of roads operated by receivers was 3971.43, or an increase of 3175.61, as compared with 1905. The number of roads in the hands of receivers was 34.

Equipment.

On June 30, 1906, there were in the service of the carriers 51,672 locomotives, the increase being 3315. These locomotives, excepting 1090, were classified as: Passenger, 12,249; freight, 29,848, and switching, 8485.

The total number of cars of all classes was 1,958,912, or 116,041 more than for the year 1905. This rolling stock was thus assigned: Passenger service, 42,262 cars; freight service, 1,837,914 cars, and company's service, 78,736 cars. These figures do not include cars owned by private commercial firms or corporations.

The reported number of persons on the pay rolls of the railroads in the United States on June 30, 1906, was 1,521,355, which is equivalent to an average of 684 employees per 100 miles of line. These figures show an increase in the number of employees as compared with the year 1905, of 139,159, or 47 per 100 miles of line. Of the employees 59,855 were enginemen, 62,678 firemen, 43,936 conductors, and 119,087 were other trainmen. There were 49,659 switch tenders, crossing tenders and watchmen.

The total amount of wages and salaries reported as paid to employees during the year ending June 30, 1906, was \$900,801,653; but this amount is deficient by more than \$27,000,000 because of the loss of railroad records in the San Francisco calamity.

Capitalization of Railroad Property.

On June 30, 1906, the par value of the amount of railroad capital outstanding was \$14,570,421,478, which is equivalent to a capitalization of \$67,936 per mile. Of this capital there existed as stock \$6,803,760,093, of which \$5,403,001,962 was common and \$1,400,758,131 preferred; the remaining part, \$7,766,661,385, represented funded debt, consisting of mortgage bonds, \$6,266,770,962; miscellaneous obligations, \$973,647,924; income bonds, \$301,523,400; and equipment trust obligations, \$224,719,099.

Of the total capital stock outstanding \$2,276,801,333, or 33.46 per cent., paid no dividends. The amount of dividends declared during the year was \$272,795,974, being equivalent to 6.03 per cent. on dividend paying stock. For the year ending June 30, 1905, the amount of dividends declared was \$237,964,482. Of the total amount of stock outstanding, \$6,803,760,093, 12.60 per cent. paid from 1 to 4 per cent.; 11.34 per cent. from 4 to 5 per cent.; 7.60 per cent. from 5 to 6 per cent.; 9.54 per cent. from 6 to 7 per cent., and 14.94 per cent. from 7 to 8 per cent. The total amount of funded debt (omitting equipment trust obligations) that paid no interest was \$287,954,851, or 3.82 per cent. Of mortgage bonds, \$208,060,486, or 3.32 per cent.; of miscellaneous obligations, \$2,827,570, or 0.29 per cent., and of income bonds, \$77,066,795, or 25.56 per cent., paid no interest.

Of the total amount of stock outstanding \$2,257,175,799 was reported as owned by railroad corporations, and of bonds \$641,305,030 was so reported.

Public Service of Railroads.

The report indicates that the number of passengers carried in the year ending June 30, 1906, was 799,507,838, this item being 60,673,171 more than for the year ending June 30, 1905. The passenger mileage, or the number of passengers carried one mile, was 25,175,480,383, the increase being 1,375,330,947 passenger miles.

The number of tons of freight shown as carried (including freight received from connections), was 1,631,374,219, which exceeds the tonnage of the year 1905 by 203,642,314 tons. The ton-mileage, or the number of tons carried one mile, was 215,877,551,241, the increase being 29,414,441,731 ton-miles. The number of tons carried one mile per mile of line was 982,401, indicating an increase in the density of freight traffic of 121,005 ton-miles per mile of line.

The average revenue per passenger per mile for the year ending June 30, 1906, was 2.002 cents. For the preceding year the average was 1.962 cents. The average revenue per ton per mile was 0.748 cent; the like average for the year 1905 was 0.766 cent. The earnings per train mile show an increase both for passenger and for freight trains. The figures show an increase in the average cost of running a train one mile. The ratio of operating expenses to earnings for the year 1906 was 66.08 per cent. For 1905 this ratio was 66.78 per cent.

Earnings and Expenses.

The gross earnings were, for the year ending June 30, 1906, \$2,325,765,167, being \$243,282,761 greater than for the year 1905. The operating expenses were \$1,536,877,271, or \$146,275,119 more than in 1905. The following figures present a statement of gross earnings in detail and show the increase of the several items over those of the previous year: Passenger revenue, \$510,032,583—increase, \$37,337,851; mail, \$47,371,453—increase, \$1,945,328; express \$51,010,930—increase, \$5,861,775; other earnings from passenger service, \$11,314,237—increase, \$274,095; freight revenue, \$1,640,386,655—increase, \$189,613,817; other earnings from freight service, \$5,645,222—increase, \$564,956; other earnings from operation, including unclassified items, \$60,004,087—increase, \$7,684,939. Gross earnings from operation per mile of line averaged \$10,460, the corresponding average for the year 1905 being \$862 less.

The operating expenses assigned to the four general classes were: For maintenance of way and structures, \$311,720,820; maintenance of equipment, \$328,554,658; conducting transportation, \$836,202,707; general expenses, \$59,752,230; undistributed, \$646,856. Operating expenses averaged \$6912 per mile of line, this average showing an increase of \$503 per mile in comparison with the year 1905.

The income from operation or net earnings amounted to \$788,887,896. This amount exceeds the corresponding one for the previous year by \$97,007,642. The net earnings per mile of line for 1906 averaged \$3548; for 1905, \$3189, and for 1904, \$2998. The amount of income attributable to other sources than operation was \$256,639,591. There are included in this amount the following items: Income from lease of road, \$119,604,619; dividends on stocks owned, \$66,861,656; interest on bonds owned, \$20,537,011, and miscellaneous income, \$49,636,305.

The total income (\$1,045,527,487)—that is, the net earnings and income from lease, investments, and miscellaneous sources—is the amount from which fixed and other charges against income are taken to ascertain the sum available for dividends. Such deductions aggregated \$660,341,159, thus leaving \$385,186,328 as the net income for the year ending June 30, 1906, available for dividends or surplus.

The amount of dividends declared during the year under review (including \$55,593 representing other earnings to stockholders) was \$272,851,567, leaving as the surplus from the operations of the year ending June 30, 1906, \$112,334,761. The surplus from operations as shown for the preceding year was \$89,043,490. The amount of deductions from income as stated above (\$660,341,159), comprises these items: Salaries and maintenance of organization, \$571,431; interest accrued on

funded debt, \$322,555.934; interest on current liabilities, \$11,653,076; rents paid for lease of road, \$122,290,911; taxes, \$74,785,615; permanent improvements charged to income account, \$49,642,631; other deductions, \$79,441,561.

The total number of casualties to persons on the railroads for the year ending June 30, 1906, was 108,324, of which 10,618 represented the number of persons killed and 97,706 the number injured. The number of passengers killed in the course of the year 1906 was 359 and the number injured 10,764. In the previous year 537 passengers were killed and 10,457 injured.

The British Iron Trade.

September thus far has been rather disappointing, according to British iron market reports. While the pig iron trade has been in such a position that the falling off in the demand from the United States has not made any serious impression, there is already speculation in some quarters as to the possibilities of the dumping of American steel products. The usual improvement in trade in September and the advances in prices ordinarily noticed in that month have not appeared this year. Pig iron prices have been easier and at the same time coke has advanced. A Middlesbrough market report of September 12 to the *London Iron and Coal Trades Review* says:

"It is not often that we find coke rising in value when Cleveland pig iron is falling, but that is the case now, with the result that coke is relatively a good dealer than pig iron, and anyone who has to buy coke at the price can hardly hope to get a profit if he sells his pig iron at the figures that are now ruling. Furnace coke of medium quality a short time ago could be got at 20 shillings 6 pence per ton delivered at the Middlesbrough furnaces, now 22 shillings 6 pence must be paid for it, while No. 3 pig iron has during the same time fallen in value from 58 shillings 6 pence to 55 shillings 3 pence. With such a price as 55 shillings 3 pence per ton for No. 3 Cleveland pig iron the consumers should be able to get their coke at 18 shillings 6 pence per ton. Such a price as 22 shillings 6 pence for coke represents a price equal to 67 shillings 6 pence per ton for No. 3 pig iron, or over 12 shillings more than can be realized. Such prices as are now charged for coke have not been reported since 1900. The extraordinary demand for coal is due in the main to the large requirements of Continental consumers, and more coking coal as well as other kinds would be sent away if steamers could be obtained in sufficient numbers."

The E. J. Jones Company, Buffalo, N. Y., has been incorporated with a capital stock of \$500,000 to manufacture steel balls for ball bearings. The new company which was organized largely through the instrumentality of E. J. Jones of Arlington, Mass., is a consolidation of the interests of several small manufacturers of steel balls, two of which were located in Massachusetts, one in New Jersey and one in Buffalo. The plant of the latter—the Buffalo Excelsior Machine Company—which has been acquired, is located on the New York Central Railroad and Military road, North Buffalo, and will be materially enlarged; its machinery equipment greatly increased, and it will become the principal manufacturing plant of the amalgamated interests represented in the new company.

The new stack of the Woodward Iron Company, Woodward, Ala., is nearing completion, and it is expected that the torch will be applied within the next three weeks. Superintendent Lodge, who has been with the company during the reconstruction of the furnace, will leave about October 1, when it is expected that the stack will be ready for service.

By the breaking of a cable a cage was precipitated to the bottom of a shaft at the Rolling Mill iron mine of the Jones & Laughlin Steel Company at Negaunee, Mich., September 20. Eleven men were killed and six others seriously injured.

An Alternating Current Coal Mining Installation.

The McKell Coal & Coke Company, after operating its mine at Kilsyth, W. Va., for a number of years with electric power generating the direct current at 275 volts locally, was confronted with the necessity of supplying electric power for newer operations farther up Loup Creek. From the following facts, furnished by Timothy W. Sprague and Charles K. Stearns, consulting engineers, and given out by the Allis-Chalmers Company, Milwaukee, Wis., which furnished the principal power and electrical equipment, it may be seen how advantageously this problem was solved:

The first plan considered was placing other power plants at each operation. Lack of water during a portion of the year was, however, an obstacle, and, further, it meant a large increase in operating expense, each plant requiring its own engineer and fireman. Moreover, the distances between the new operations, and from the existing plant to the new operations, is too great to allow of low-voltage transmission. Further than this, the installation of such individual low tension power plants would meet the requirements only temporarily. The extent of the coal to be eventually mined and handled over the tipples is so great that the cost of distributing electric power over the entire territory from these stations in the form of direct current would largely offset the economy of its use.

A central station from which power could be distributed to the many points needed was finally decided upon. It could not be located at the center of the entire property, owing to the lack of suitable water supply, so Kilsyth was selected. It offered the advantage of combining the new with the already existing power plant, which it is advisable to maintain for the present. The first unit installed was 500 kw. and as power requirements increase a second may be placed in the same building, and the building may be extended to accommodate a third when necessary. The existing boiler plant, consisting of four horizontal tubular boilers, was increased by the addition of four 72-in. by 18 ft. boilers of the same general type. The engine is of the Corliss type, 26 x 42 in., running at 120 rev. per min., with a normal steam pressure of 115 lb. This is directly connected to a 500-kw., 24-cycle, 6600-volt, three-phase, generator, revolving field type, with 24 poles. It is separately excited by a 20-kw. generator wound for 230 volts, directly connected to a high-speed engine.

At each substation the transformers reduce the alternating current to a voltage of 160 for conversion to direct current at 250 volts, through rotary converters. Each substation is designed for an increase in capacity to double the present installation. These substations are located to reduce the direct current distributing distance as much as possible and at the same time place them where the small attention required may be conveniently given by employees at such points as the tipples.

The three mines are provided with Clifford-Capell fans, which, owing to their heavy demand for power when run at their fullest capacity, are operated by alternating current motors independently of the substations. Two of the fans require about 80 hp. each, and the third takes about 40 hp. for driving.

Induction or synchronous motors for various purposes, such as the operation of mine pumps, &c., may be placed practically at any points needed in the entire territory, at a nominal cost, the voltage of 5600 reducing the size of conductors so that the principal item of expense in such distribution is materially cut down. It is equally feasible to place other rotary transformer stations at distant points on the property for direct current distribution underground, and if such distribution is needed at points in the workings midway between the outcrops on the main creek and its branches and those on the head waters of Mill Creek, the high tension current may be carried overhead to a point above the center of such a needed distribution and thence down a bore hole to an underground transformer station similar to the substation.

NEWS OF THE WORKS.

Iron and Steel.

The Schoen Steel Wheel Company, Pittsburgh, Pa., which has started the erection of an open hearth steel plant at its works at McKees Rocks, will install in connection with the plant suitable machinery to provide for an output of 1900 wheels per day from its two mills already erected.

The Youngstown Sheet & Tube Company, Youngstown, Ohio, is making some large additions to its pipe mill, which include two butt weld and one lap weld furnace. It is the intention as soon as these furnaces are well under way to begin work on two more butt weld and one more lap weld, which will make a total of six new furnaces. The latter three furnaces have not yet been authorized by the Board of Directors, but will be in a very short time.

The Forter-Miller Engineering Company, Hartje Building, Pittsburgh, has just finished the building of a very large gas producer plant at the works of the Pittsburgh Forge & Iron Company, Allegheny, Pa.

General Machinery.

The Nordeen Iron Works, Everett, Wash., engineer and machinist, is building an addition to its plant, consisting of a building two stories, 52 x 65 ft. The ground floor will be used as a machine shop, and the second floor will contain the office and storage space for mill supplies.

The Ingle Machine Company, Rochester, N. Y., is to erect a new building, 100 x 230 ft., two stories. Orders for the machinery requirements have about all been placed.

The Virginia Blower & Mfg. Company, Richmond, Va., has been incorporated with a capital stock of 50,000, and is now prepared to manufacture and install blow pipe systems for conveying various classes of material, and blower systems for heating and ventilation. The company has contracts to equip several manufacturing plants with its blow pipe system and conveyors, and is making arrangements to equip a large plant. W. Pernet Patterson is president and treasurer, and A. J. Leitch, who has been engaged for the past 18 years in the same line of business, is secretary and general manager.

The Beaumont Iron Works, Beaumont, Texas, manufacturer of cars, sawmills and oil well machinery, is making extensive improvements to its plant, which will materially increase its size and capacity. The company, which is one of the oldest and most important of its kind in the Southwest, builds all kinds of logging cars and is extensively engaged in the repair of standard railroad and tank cars, and also makes a specialty of heavy castings and large forgings. Improvements now under way include the erection of a two-story building, 42 x 400 ft., which will be used as a car shop; the plans also include a well equipped wood shop in connection with large erecting rooms.

The Board of Public Works, Los Angeles, Cal., will receive bids until October 7 for the necessary machinery for the equipment of a Portland cement plant with a daily capacity of about 1000 bbl., consisting of three rotary kilns, crushers, pulverizers, dryers, conveyor, elevators, cars, pulleys and shafting, silex, mill lining and flint pebbles.

McDowell & Co., Allegheny, Pa., dealers in second-hand machinery, have recently purchased the real estate and buildings of the gas pumping plant operated by the Pittsburgh Oil & Gas Company at Frankton, Ind., the buildings containing two cross compound Philadelphia Engineering Company's Corliss engines, 34 and 60 x 60 in., connected to two high pressure cylinders and two low pressure gas cylinders, one large Connorsville blower, together with all other machinery which constituted the equipment. The purchasers intend to dispose of all or part of the equipment in the open market.

There is no foundation for the report that the Bessemer & Lake Erie Railroad is preparing plans for a large car building plant at Greenville, Pa. The work under way at that point covers the enlargement of the machine and general repairs shops and will be completed this fall.

Power Plant Equipment.

The Hygeia Ice Company, Poughkeepsie, N. Y., is completing a reinforced concrete building, 70 x 100 ft., five stories high, to be used as a refrigerating plant, in which the General Fireproofing Company system has been used. The building was erected by the owner, which employed E. L. Phillips, engineer, to supervise the construction, and the entire reinforcement was sold by the General Fireproofing Company, erected in the forms ready for concreting. To gain floor space, cast iron columns were used. These were so designed that the links by which the pin-connected girder frames in adjoining beams are tied together over each point of support pass through the columns so that the reinforcement for the entire floor forms one continuous rigid steel frame. Cold twisted lug bars are used in the floor slabs. The installation of the reinforcement and the erection of the building proceed so satisfactorily that the General Fireproofing Company has been awarded two other contracts by the Hygeia Ice Company, for fabricating and erecting pin-connected girder frames for reinforcement of a second refrigerating plant and for a power house, both of which are about to be erected.

Prominent men of Joplin and Webb City, Mo., have formed the Keller Steam Economizer Company, to place on the market the Keller feed water heater, which combines the features of the open type heater with the best features of the closed type, and by which the water is returned to the boiler about 30 degrees hotter, it is claimed, than can be procured by other open heaters by pumping the water from the settling chamber through the exhaust steam directly into the boiler. Offices have been established at 304 Bartlett Building, Joplin, in charge of Guy T. Humes, manager. Several of the heaters are now being manufactured in a local machine shop, and steps are being taken toward the erection of a plant. John R. Holmes is president; George W. Moore, vice-president, and Fred O. Small, secretary and treasurer.

Among orders for foreign shipments recently received by the Buffalo Forge Company of Buffalo, N. Y., is one of special interest, covering a horizontal center crank compound automatic engine, 13 x 20 x 24 in., for direct connection to a General Electric generator. This unit is to be used for the electric illumination of the tower of Noshiro, which is located on the northwest coast of Japan.

The Granite Electric Light & Power Company, Granite, Okla., has been recently incorporated with a capital stock of \$10,000, for the purpose of establishing a light and power plant. The incorporators are K. C. Cox, H. J. Hayes, A. Hindert and others.

The Hartford City Artificial Ice & Cold Storage Company, Hartford City, Ind., will rebuild on a larger scale the plant recently destroyed by fire as soon as a new site is obtained.

Foundries.

The Vulcan Foundry Company, Grand Rapids, Mich., has been incorporated with a capital stock of \$50,000, for the manufacture, sale and installation of the Peck hot water and steam boilers. These boilers, which are designed for general heating purposes, have for the past six years been manufactured under the name of the Peck Heater Company in Syracuse, N. Y. In addition to this work the company will do a general foundry and machine shop business, and is at the present time supplying one of the leading railroad shops in its vicinity all its gray iron castings. The officers are Lewis T. Peck, president; David Wolf, vice-president, and M. H. Stimson, secretary and treasurer.

The Wood-Evertz Stove Company, Springfield, Mo., will build a new plant which will consist of a main foundry building, 80 x 160 ft., and a factory building, 50 x 150 ft. The capital stock of the company has been increased from \$100,000 to \$150,000.

The National Brake & Electric Company, Milwaukee, Wis., is planning the erection of a building of steel and brick construction as an addition to its foundry department. Since this improvement is to take the place of a wooden building now in use it is merely an enlargement of the existing plant. No additional equipment will be required.

The Prescott Company and the Stephenson Company of Marinette, Wis., have for the past three months been making many tons of gray iron castings for the Platt Iron Company, Dayton, Ohio.

The Sharon Foundry Company, Sharon, Pa., is making some repairs to the open hearth furnaces in its plant at Wheatland, Pa., but expects to resume operations during this week.

Bridges and Buildings.

The Milwaukee County Board has awarded the contract for the erection of the new Grand avenue viaduct to the Newton Engineering Company, Milwaukee, on its bid of \$372,000. The next lowest bid was that of James O. Hayward, Chicago, \$382,000.

Fires.

William R. Martin's iron foundry, Lancaster, Pa., was damaged \$3000 by fire September 18.

The plant and buildings of the Intervest Peat Fuel Company, Winnipeg, Man., were burned September 14, the loss being about \$40,000.

The large coal pockets of the Erie Railroad at Hornell, N. Y., which were equipped with extensive hoisting machinery, were destroyed by fire September 22. The loss is placed at \$75,000.

The vehicle plant of the Atwater-Nelson Buggy Company, Thomaston, Ga., was destroyed by fire September 21, with a loss of about \$75,000.

The plant of the United States Radiator Company, West Newton, Pa., was damaged \$25,000 by fire September 13.

The machinery building of the Lee Mfg. Company, Thomasville, N. C., was burned last week, the loss being about \$15,000.

Hardware.

The Fanner Mfg. Company, Cleveland, Ohio, maker of hardware specialties and a complete line of stove trimmings, has increased its gray iron capacity fully 100 per cent., and has also built a large malleable iron foundry. The company is also equipped to do all kinds of metal stamping and die work. Another line that has lately been taken up is the manufacture of brass beds, of which the company is turning out 200 or 300 a week.

The Pennsylvania Wire Forming Company, corner Eleventh and Noble streets, Philadelphia, Pa., has been incorporated under the laws of New Jersey. The company's business will be

to form wire into different shapes, to cut and straighten wire, and to manufacture wire goods in general. They will also accept orders for special designs. The plant has been partially equipped with machinery, and operations have been commenced. Later the company hopes to take up stamping, spinning, &c. The officers are Lee Stoev Kinkade, president and general manager; Joseph Boxindine, vice-president and treasurer, and Charles Blumel, secretary.

The Roanoke Stamping & Enameling Company, Roanoke, Va., has lately been incorporated with the following officers: I. M. Warren, president and treasurer; J. A. Sprinkle, vice-president; L. B. Davis, secretary, and W. L. Scales, superintendent. The company will manufacture all kinds of kitchen ware of sheet steel, enameled. A plant 125 x 190 ft., now in course of erection, will be equipped with the most modern type of machinery, at a cost of \$22,000, the greater part of which will be supplied by the E. W. Bliss Company, Brooklyn, N. Y., electric power being furnished.

The Southern Stamping Company, Nashville, Tenn., incorporated in December last and starting on a very small scale, was obliged to double the size of its shop in February, and is now getting ready to move into a plant with three times the present capacity. The company manufactures a line of harness ornaments for which a ready sale has been found, Nashville itself being a large harness center. The company is also open for contract manufacturing of metal articles of small and medium size, stamping particularly.

The Graham Nut Company, Pittsburgh, Pa., states that the improvements and extensions which the company is making in connection with its nut and bolt plant are progressing steadily. Much of the new machinery has been installed in the bolt department, and the company expects to be in full operation in all departments in a few weeks.

The Eastern Bolt & Nut Company, East Providence, R. I., has recently added to its main structure a building 60 x 200 ft., of the same general type. It has a truss roof of steel, brick walls and mullion windows. The monitor roof extends 100 ft. of the length of the building. The additional facilities thus provided will be used for bolt forging purposes and an iron warehouse, and the equipment is all arranged for. The forging department is not entirely moved into the new quarters and there is yet to be installed an exhaust system. The company manufactures various kinds of bolts and nuts and much special work of kindred character to specifications.

The Goshen Churn & Ladder Company, Goshen, Ind., has acquired the plant of the Loomis Mfg. Company, Coldwater, Mich., and it will be moved to Goshen.

As a result of the conclusion of a successful defense in proceedings brought against it for infringement of patents in the Federal Court of Cincinnati, the D'Arcy Spring Company, Kalamazoo, Mich., manufacturer of spiral seat and bed springs, has decided to enlarge its plant and increase its output. Its business for the present year is double that of 1906.

Miscellaneous.

The Seattle Car Mfg. Company, Seattle, Wash., whose plant was recently destroyed by fire, intends to rebuild at Renton, a suburb of Seattle. The capital stock of the company will be increased, and the new plant will be equipped with modern machinery.

The Jacobs Mfg. Company, Hartford, Conn., maker of the Jacobs improved drill chuck, is installing more machinery and making additional tools and fixtures, which will enable it to largely increase its output.

The Superior Iron Works, Superior, Wis., has prepared plans for an addition to its plant, to consist of a new blacksmith shop to cost approximately \$4000. The company will construct the building under its own supervision and will use in its construction concrete blocks.

The F. C. Newell Multograph Corporation, Cleveland, Ohio, has been incorporated, with a capital stock of \$1,000,000, to place on the market the multograph, an electric bulletin printing device invented by Mr. Newell. The machine parts will probably be manufactured by contract. The officers are F. C. Newell, president; B. B. Avery, vice-president; Charles E. Kennedy, secretary, and W. E. Telling, treasurer.

The recently incorporated Acme Plating Company, Columbus, Ohio, has been organized by the election of F. C. Kingsbury, president and D. S. Roome, secretary and general manager.

The May-Fleberger Company, capitalized at \$150,000, has been incorporated at Akron, Ohio, to succeed the partnership of May & Fleberger, furnace builders. The incorporators are R. A. May, Frank Fleberger, Frank Nolte, A. G. Cripps and F. B. Theiss.

The A. P. Fox Specialty Company, Indianapolis, Ind., has been incorporated, with \$100,000 capital stock. It will build a factory for the manufacture of dental office apparatus and equipment. A. P. Fox is president.

The Indiana Fibre Box Company has been organized at New-castle, Ind., by Frank L. Wayman of Newcastle and E. W. Bonfield and J. E. Fellows of Chicago. The new plant will be established in buildings formerly used for another factory.

Tentative plans have been approved by Wayne County Commissioners at Richmond, Ind., for a bridge over Whitewater River, 900 ft. long and 106 ft. above the water line.

A petition in bankruptcy has been filed against the Scofield Company, New York and Philadelphia, which is a large and prominent contracting engineering concern. The company has contracts for work on hand amounting to about \$5,000,000, and it is stated that the assets exceed \$500,000.

The Miller Electric Company, Terre Haute, Ind., dealer in electrical supplies and fixtures, has been reorganized and incorporated, with a capital stock of \$10,000. The directors are Frank B. Miller, Jacob W. Miller and Warner E. Coords.

Drawback Regulations.

WASHINGTON, D. C., September 23, 1907.—The Treasury Department has found it necessary to call the attention of customs officials and exporting manufacturers to the laxity in the enforcement of the regulations which has recently marked the practice at several important ports. In certain cases goods entered for exportation with benefit of drawback have been laden and actually exported before the exporters have applied for the establishment of a rate of allowance; while in other cases applications made in due form and in good season have been held at the ports where filed until the goods in question were shipped, instead of being forwarded promptly to the Treasury Department. These practices are directly contrary to the customs regulations relating to drawbacks, and the Secretary of the Treasury has therefore deemed it necessary to issue a circular calling attention to the provisions of the regulations and especially to the necessity for promptly transmitting to the Department all applications for the establishment of drawback rates. The attention of collectors is drawn to the provisions of article 1196 of the customs regulations, which is as follows:

No drawback shall be allowed on any article of domestic manufacture exported until the rate of allowance has been established by the Secretary of the Treasury. Application for allowance on an article for which no rate has been established shall be made to the Secretary of the Treasury. Such application shall contain a detailed statement, verified by oath or affirmation, showing the kinds of the articles intended for export, the kinds and quantities of the imported materials used in the production of each particular article, the rate of duty paid on such material, and such other data as will enable the Department to determine, first, whether or not the foreign materials so appear in the article to be exported that the quantity of each such material can be readily ascertained, and, second, the rate of drawback thereon.

The requirement that the rate of allowance shall have been established by the Secretary of the Treasury before the exportation of the goods in order to entitle them to drawback has in some cases proved a hardship, especially where the order for the goods called for immediate shipment, thus rendering it impracticable to secure the approval of an application for a drawback rate prior to exportation. Recognizing this condition, the Department will consider requests to waive the requirement concerning the filing of applications prior to exportation in cases where the manufactured articles shall have been exported after compliance with all the regulations relating to timely entry, inspection, supervision of lading &c.

Drawback on Scrap Steel.

The Treasury Department has prepared a series of regulations for the allowance of drawback of duty paid on imported scrap steel used in the manufacture of rails, billets, plates, bars, structural material, including plates, beams, channels, angles, tees and other structural forms. These regulations, which have been prepared upon the application of the Lackawanna Steel Company, Buffalo, N. Y., provide for a drawback equal in amount to the duty paid upon the scrap steel used, less the legal deduction of one per cent. In liquidation, the quantity of imported scrap steel which may be taken as the basis for the allowance of drawback, may equal the quantities declared in the drawback entry, after official verification of the exported quantities, provided that it shall not exceed the quantities shown in the sworn statement filed by the manufacturers.

W. L. C.

In the year ending June 30, 1901, the National Tube Company, Pittsburgh, made and shipped 197,543,350 lineal feet of pipe, while for the year ending June 30, 1907, it made and shipped 617,827,738 lineal feet, an increase in six years of over 210 per cent.

The Iron and Metal Trades

The heavy orders entered in the Wire trade lately are considered significant, since that branch of the industry reflects better than any other the demand from a very wide range of sources, and from the agricultural community in particular. It emphasizes the reports from other quarters that the farmers are having better crops than at first expected, and at very satisfactory prices.

In the heavy lines the business is undeniably dull, and a considerably lessened output during the winter months seems inevitable, but prices are at a safe level, compared with those which have prevailed during the culmination of former booms.

Interest is passing from the Eastern Pig Iron trade, which has found its level for the present, to the West and South. The makers in Alabama and Virginia maintain the same attitude of confidence. They are more concerned with protecting the trade which will be taking high priced iron to the end of the year, than with new business. Some of the furnaces of the Valleys and along the Lakes are, however, displaying some signs of weakness, in their quotations for Foundry Iron.

There has been some movement in Ferromanganese on the basis of \$56. Reports are current that the leading foreign makers are negotiating for an agreement to regulate prices.

The Steel trade is steady and the Rail trade is awaiting the results of the conferences on the new specifications. The Edgar Thomson mill has turned over to Lorain the rolling of 20,000 tons of Rails, thus allowing the Ohio plant to keep running on Billets and Sheet Bars.

Complaints of low bids by fabricators of Structures are spreading. Beyond the placing of a contract for 8000 tons for the Santa Fé bridge and 2500 tons of work for the New York Central, no orders of consequence have been placed. Generally speaking, there is unusual delay in bringing contracts to a head, but then, again, work which had been apparently suspended is coming up again. A case in point is the 10,000 tons of material for buildings for the Corn Products Company at Summit, Ill.

While there is some uneasiness over prices in the market for the lighter gauges of Black Sheets and Roofing Sheets, the Tin Plate mills have been in receipt during the past few weeks of more liberal orders than expected from canners.

The Cast Iron Pipe trade is dull. The only large inquiry now in the market is 6000 tons for Los Angeles, Cal.

The feeling is growing that Copper has come down to a basis which justifies at least moderate purchases. It is true, however, that Electrolytic Copper has sold this week at 14½¢. For the near future the "holding of the umbrella" by the large interests may be regarded as a feature of strength, but it introduces for a longer period the element of doubt whether the operation may not tire the strongest arms.

Spelter, which has had an almost uninterrupted decline from 6.80¢. to 5.15¢., St. Louis, is now firmer, there being some large inquiries in the market, principally from galvanizers. The Brass mills are not buying.

Lead, too, which plunged from 6.35¢. to 4.55¢., St. Louis, is stronger.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

	Sept. 25, 1907.	Sept. 18, 1907.	Aug. 22, 1907.	Sept. 26, 1906.
PIG IRON, Per Gross Ton :				
Foundry No. 2, Standard, Philadelphia	\$20.25	\$20.50	\$22.00	\$20.50
Foundry No. 2, Southern, Cincinnati	21.75	21.25	22.75	19.00
Foundry No. 2, Local, Chicago ..	22.50	23.50	24.50	20.00
Bessemer, Pittsburgh	22.90	22.90	22.90	19.60
Gray Forge, Pittsburgh	20.90	20.90	21.90	17.85
Lake Superior Charcoal, Chicago ..	26.50	27.00	27.50	20.50

BILLETS, &c., Per Gross Ton :				
Bessemer Billets, Pittsburgh ..	29.50	29.50	29.00	28.00
Forging Billets, Pittsburgh	33.00	32.00	33.00	31.00
Open Hearth Billets, Phila.	31.00	31.00	31.50	32.00
Wire Rods, Pittsburgh	36.00	36.00	36.00	34.00
Steel Rails, Heavy, Eastern Mill ..	28.00	28.00	28.00	28.00

OLD MATERIAL, Per Gross Ton :				
Steel Rails, Melting, Chicago ..	17.00	17.00	17.00	17.00
Steel Rails, Melting, Phila.	16.75	16.75	17.00	18.50
Iron Rails, Chicago	20.25	20.25	20.50	25.50
Iron Rails, Philadelphia	20.50	20.50	20.50	25.00
Car Wheels, Chicago	24.50	24.50	24.50	19.00
Car Wheels, Philadelphia	23.00	23.00	23.50	19.00
Heavy Steel Scrap, Pittsburgh ..	17.00	17.00	17.75	17.50
Heavy Steel Scrap, Chicago	14.75	14.75	14.75	16.50
Heavy Steel Scrap, Philadelphia ..	16.50	16.50	16.75	18.25

FINISHED IRON AND STEEL,				
Per Pound :	Cents.	Cents.	Cents.	Cents.
Refined Iron Bars, Philadelphia ..	1.75	1.80	1.85	1.83½
Common Iron Bars, Chicago	1.78	1.78	1.78	1.71½
Common Iron Bars, Pittsburgh ..	1.70	1.70	1.70	1.60
Steel Bars, Tidewater, New York ..	1.81	1.86	1.86	1.64½
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.50
Tank Plates, Tidewater, New York ..	1.86	1.86	1.86	1.74½
Tank Plates, Pittsburgh	1.70	1.70	1.70	1.60
Beams, Tidewater, New York	1.86	1.86	1.86	1.84½
Beams, Pittsburgh	1.70	1.70	1.70	1.70
Angles, Tidewater, New York	1.86	1.86	1.86	1.84½
Angles, Pittsburgh	1.70	1.70	1.70	1.70
Skelp, Grooved Steel, Pittsburgh ..	1.85	1.85	1.85	1.57½
Skelp, Sheared Steel, Pittsburgh ..	1.95	1.95	1.95	1.60

SHEETS, NAILS AND WIRE,				
Per Pound :	Cents.	Cents.	Cents.	Cents.
Sheets, No. 27, Pittsburgh	2.50	2.50	2.50	2.40
Wire Nails, Pittsburgh	2.05	2.05	2.00	1.90
Cut Nails, Pittsburgh	2.10	2.15	2.10	1.90
Barb Wire, Galv., Pittsburgh	2.50	2.50	2.45	2.35

METALS, Per Pound :				
Lake Copper, New York	15.00	15.50	19.00	20.00
Electrolytic Copper, New York ..	14.75	15.12½	18.00	19.87½
Spelter, New York	5.25	5.00	5.70	6.35
Spelter, St. Louis	5.15	4.85	5.50	6.25
Lead, New York	4.75	4.75	5.10	5.95
Lead, St. Louis	4.55	4.67½	5.00	5.85
Tin, New York	37.15	37.62½	37.20	40.40
Antimony, Hallett, New York	11.00	10.00	9.00	24.00
Nickel, New York	45.00	45.00	45.00	45.00
Tin Plate, 100 lb., New York	\$4.09	\$4.09	\$4.09	\$3.94

Chicago.

FISHER BUILDING, September 25, 1907.—(By Telegraph.)

The quieter trend of business throughout the market is emphasized by the meager features of interest reflected in transactions reported for the past week. While the mills are busy with the execution of orders on old contracts, specifications for which are generally liberally supplied, the amount of new business being offered in the way of forward contracts is comparatively small. Notwithstanding the large tonnage of Structural Material under negotiation for buildings and bridges, no further closures are reported, and a number of such projects that a short time ago promised early maturity, have been postponed until next year. The lessened volume of business in fabricated material is doubtless responsible for the keener competition noticed, and some extremely low bids have resulted. A renewal of activity in Rails is awaiting the completion of negotiations between the roads and mills. The Pig Iron market remains dull and featureless, and transactions, which are almost wholly for lots of small tonnage, are limited to nearby requirements. In its present state of weakness there is nothing in either present or prospective conditions to induce buyers of Iron to anticipate their needs far in advance. It is not surprising, therefore, to find an utter lack of interest in deliveries running into the coming year. In point of activity, Cast Iron Pipe is about on a par with Pig Iron. Very little new tonnage is in sight, and it is evident that purchases are being withheld in anticipation of lower prices. Intimations of an early revision of present quotations are not wanting.

Although no actual recession in Scrap prices have taken place since last report, it cannot be denied that the market is weak and by no means firmly entrenched at its present level. The effects of this week's heavy railroad offerings are awaited with interest.

Pig Iron.—As the market rounds into the final quarter, with no signs of an active buying movement in sight, it is apparent that consumers generally intend to supply their stocks for the remainder of the year at least by month to month purchases. The only observable change in the situation as far as demand is concerned seems to be the greater number of inquiries of this character for small lots. Furnaces are now well up on deliveries, and some interests are by no means indifferent in their efforts to secure business. The continued reluctance of buyers to take hold at present quotations has a depressing influence upon prices, that, in spite of the firm stand taken by some of the larger producers, has resulted in progressive weakness. The principal Southern interests are quoting \$18 to \$18.50, Birmingham, for last quarter business, but sales at as low as \$17 have been made by some of the smaller concerns. Prices through the last quarter are now practically on a level for both the early and late dates of this period. Premiums for prompt delivery have disappeared, a fact that argues adequate stocks in melters' yards and prompt shipments for replenishment. In the absence of an inquiry sellers are naturally unwilling to venture quotations applying to shipments extending over the first and second quarters of next year. While what might be done is wholly a matter of conjecture, it is likely that the appearance of a round lot of desirable tonnage would bring out lower prices than have yet been named for this delivery. The following prices are for October, November and December delivery, f.o.b. Chicago:

Lake Superior Charcoal.....	\$26.50 to \$27.00
Northern Coke Foundry, No. 1.....	23.00 to 23.50
Northern Coke Foundry, No. 2.....	22.50 to 23.00
Northern Coke Foundry, No. 3.....	22.00 to 22.50
Northern Scotch, No. 1.....	23.50 to 24.00
Ohio Strong Softeners, No. 1.....	23.00 to 23.50
Ohio Strong Softeners, No. 2.....	22.50 to 23.00
Southern Coke, No. 1.....	22.85 to 23.35
Southern Coke, No. 2.....	22.35 to 22.85
Southern Coke, No. 3.....	21.85 to 22.35
Southern Coke, No. 4.....	21.35 to 21.85
Southern Coke, No. 1 Soft.....	22.85 to 23.35
Southern Coke, No. 2 Soft.....	22.35 to 22.85
Southern Gray Forge.....	20.35 to 20.85
Southern Mottled.....	20.35 to 20.85
Malleable Bessemer.....	24.40 to 24.90
Standard Bessemer.....	24.40 to 24.90
Jackson Co. and Kentucky Silvery, 6 %	30.40 to 30.90
Jackson Co. and Kentucky Silvery, 8 %	32.40 to 32.90
Jackson Co. and Kentucky Silvery, 10 %	34.40 to 34.90

(By Mail.)

Billets and Rods.—Lack of surplus tonnage above makers' rolling requirements precludes activity in the market. Local users of importance are well covered with forward contracts on Forging Billets and no inquiries for large tonnage are reported. Forging Billets are still held at \$36 to \$38, Chicago, and Wire Rods at \$37 to \$38, Pittsburgh.

Rails and Track Supplies.—The market is still waiting for the Rail buying movement to begin. Developments of the past week have produced nothing of interest in the way of orders, and no inquiries other than those of a tentative nature. A fairly good business in Light Rails is noted, but Track Supplies are quiet. We quote as follows: Angle Bars, accompanying Rail orders, 1907 delivery, 1.65c.; car lots, 1.75c. to 1.85c.; Spikes, 2.10c. to 2.20c., according to delivery; Track Bolts, 2.60c. to 2.70c., base, Square Nuts, and 2.75c. to 2.85c., base, Hexagon Nuts. The store prices on Track Supplies range from 0.15c. to 0.20c. above mill prices. Light Rails, 30 to 45 lb. sections, \$34; 25-lb., \$35; 20-lb., \$36; 16-lb., \$37; 12-lb., \$38, f.o.b. mill. Standard Sections, \$28, f.o.b. mill, full freight to destination.

Structural Material.—The hesitancy shown in the completion of Structural and other building contracts now pending emphasizes the difficulties being met by the promoters of such enterprises. Plans continue to develop on paper, but they seem to halt at the point where financial sinews are required to carry them to completion. No closures of consequence are reported by fabricators for the week just past. Nevertheless these interests are extremely busy with the execution of old contracts, and most of them have orders enough to keep their works engaged for some little time ahead. At the same time there is sharp competition for what new business does appear, which has resulted in some surprisingly low bids. Work on the new Chicago & Northwestern depot and terminals is slow in getting under way, and it is doubtful if much of it, or if any, will come into this year's tonnage account. Failure of the new city charter to carry at the recent election will defer operations on Chicago's new City Hall building, which will also go over to next year. Mills still have a good supply of specifications, but they are not crowding forward as rapidly as they were a few weeks ago. Prices from store are quoted without change, at 2.05c. to 2.10c., and mill prices at Chicago are as follows: Beams and Channels, 3 to 15 in., inclusive, 1.88c.; Angles, 3 to 6 in., ¼-in. and heavier, 1.88c.; larger than 6 in. on one or both legs, 1.98c.; Beams, larger than 15

in., 1.98c.; Zees, 3 in. and over, 1.88c.; Tees, 3 in. and over, 1.93c., in addition to the usual extras.

Plates.—Heavy outgoing shipments are largely in excess of incoming new orders, and mark a condition that promises radical relief from the congestion that has for many months been a feature of the market. Premium prices for prompt delivery have practically disappeared. Universal Plates are now available for practically normal delivery. We quote for future delivery as follows: Tank Plates, ¼-in. and heavier, wider than 6¼ and up to 100 in. wide, inclusive, car lots, Chicago, 1.88c. to 2.08c.; 3-16 in., 1.98c. to 2.18c.; Nos. 7 and 8 gauge, 2.03c. to 2.23c.; No. 9, 2.13c. to 2.33c.; Flange quality, in widths up to 100 in., 1.98c. to 2.08c., base, for ¼-in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.98c. to 2.18c.; Flange quality, 2.08c. Store prices on Plates are as follows: Tank Plates, ¼-in. and heavier, up to 72 in. wide, 2.20c. to 2.30c.; from 72 to 96 in. wide, 2.30c. to 2.40c.; 3-16 in. up to 60 in. wide, 2.30c. to 2.40c.; 72 in. wide, 2.50c. to 2.65c.; No. 8, up to 60 in. wide, 2.35c. to 2.45c.; Flange and Head quality, 0.25c. extra.

Sheets.—Good specifications and a fair amount of new business characterize the Sheet situation. Though, so far, Galvanized Sheets hold reasonably firm at current quotations, it is thought that lower prices will follow the radical decline of Spelter. But for the large amount of forward orders in hand, this result would probably already be seen. We quote mill shipments as follows, Chicago: Blue Annealed, No. 10, 2.03c.; No. 12, 2.08c.; No. 14, 2.13c.; No. 16, 2.23c.; Box Annealed, Nos. 17 to 21, 2.53c.; Nos. 22 to 24, 2.58c.; Nos. 25 to 26, 2.63c.; No. 27, 2.68c.; No. 28, 2.78c.; No. 29, 2.88c.; No. 30, 2.98c.; Galvanized Sheets, Nos. 10 to 14, 2.83c.; Nos. 15 and 16, 3.03c.; Nos. 17 to 21, 3.18c.; Nos. 22 to 24, 3.33c.; Nos. 25 and 26, 3.53c.; No. 27, 3.73c.; No. 28, 3.93c.; No. 30, 4.43c. Sheets from store: Blue Annealed, No. 10, 2.40c.; No. 12, 2.45c.; No. 14, 2.50c.; No. 16, 2.60c.; Box Annealed, Nos. 18 to 21, 2.70c.; Nos. 22 to 24, 2.75c.; No. 26, 2.80c.; No. 27, 2.85c.; No. 28, 2.95c.; No. 30, 3.35c.; Galvanized from store: Nos. 10 to 20, 3.20c. to 3.30c.; Nos. 22 to 24, 3.55c. to 3.60c.; No. 26, 3.65c. to 3.70c.; No. 27, 3.85c. to 3.95c.; No. 28, 4.15c.; No. 30, 4.65c. to 4.70c.

Bars.—Orders for Bar Iron, though fairly numerous, are for small lots. New business in Steel Bars is naturally light, since the requirements of principal users are covered by contracts already placed. Specifications continue to come forward in satisfactory volume, and shipments are being urged by consumers. Quotations, Chicago, are as follows: Steel Bars, 1.78c., with half extras; Iron Bars, 1.78c.; Hoops, 2.18c., extras as per Hoop card; Bands, 1.78c., as per Bar card, half extras; Soft Steel Angles and Shapes, 1.88c., half extras. Store prices are as follows: Bar Iron, 2.10c. to 2.25c.; Steel Bars, 2c. to 2.10c.; Steel Bands, 2c., as per Bar card, half extras; Soft Steel Hoops, 2.35c. to 2.45c., full extras.

Merchant Pipe.—All interests concerned view the quiet movement in Pipe with satisfaction, as the abnormal conditions created by the overwhelming volume of business poured into the mills made satisfactory service in deliveries impossible. With shipments now outstripping the tonnage of new orders, the delays heretofore experienced in deliveries will gradually disappear. The following mill discounts are quoted: Black Pipe, ¾ to 6 in., 71.2; 7 to 12 in., 68.2; Galvanized, ¾ to 6 in., 61.2. These discounts are subject to 1 point on the base. From store in small lots Chicago jobbers quote 68 per cent. on Black Steel Pipe, ¾ to 6 in. About 4 points advance above these prices is asked for Iron Pipe.

Boiler Tubes.—A fairly good demand is noted for Merchant Tubes from boiler builders. Jobbers' stocks are now generally well supplied with a full assortment of sizes. Mill quotations for future delivery on the base sizes are as follows: 2¾ to 5 in., in carload lots, Steel Tubes, 63.2; Iron, 50.2; Seamless, 49.2; 2½ in. and smaller, and lengths over 18ft. and 2½ in. and larger, and lengths over 22 ft., 10 per cent. extra. Store prices are as follows:

	Steel.	Iron.	Seamless.
1 to 1½ in.....	35	35	35
1½ to 2¼ in.....	50	35	35
2½ in.....	52½	35	35
2½ to 5 in.....	60	47½	47½
6 in. and larger.....	50	35	..

Merchant Steel.—A good demand for Machinery Steel, especially in Tire sizes, from wagon and carriage builders, is noted. A seasonable business of satisfactory volume for miscellaneous shapes is also reported. Quotations are as follows: Planished or Smooth Finished Tire Steel, 1.98c.; Iron Finish, up to 1½ x ½ in., 1.93c.; Iron Finish, 1½ x ½ in. and larger, 1.78c., base; Channels for solid Rubber Tires, ¾ to 1 in., 2.28c., and 1½ in. and larger, 2.18c.; Smooth Finished Machinery Steel, 2.18c.; Flat Sleigh Shoe, 1.93c.; Concave and Convex Sleigh Shoe, 2.08c.; Cutter Shoe, 2.46½c.; Toe Calk Steel, 2.33c.; Railroad Spring, 1.98c.; Crucible Tool Steel, 7¼c. to 8c., and still higher prices are asked on special grades. Shafting, 60 per cent. off in car lots; 55 per cent., less than car lots, Pittsburgh.

Cast Iron Pipe.—Aside from a letting of 800 tons of Water Pipe scheduled for September 30 by the Du Quoin Water Works, Du Quoin, Ill., there are no lots of considerable tonnage up for figures. At the third letting of about 2500 tons by Columbus (Ohio) Water Works, the bids presented came within the amount appropriated by something like \$2000, but no award of the contract has yet been made. Small orders from 50 to 150 tons make up the run of business, which is, on the whole, extremely quiet. We quote, per net ton, Chicago, as follows: Water Pipe, 4-in., \$38; 6 to 12 in., \$37; 16-in. and up, \$36, with \$1 extra for Gas Pipe.

Coke.—To a large extent the hesitation noted in the buying of Pig Iron for forward delivery is observed in Coke. For spot delivery there is a fair demand. Connellsville 72-hr. Foundry Coke holds pretty firmly, and is quoted at \$3.25 to \$3.50 per ton, at oven.

Old Material.—Extreme dullness rules in the market. There is but little demand from any source, but in spite of the lack of buying support the market has not receded from last week's quotations. In fact, transactions are too few and inconsequential to furnish a definite price basis. The market is, however, inherently weak and a belief in lower levels prevents purchases other than for immediate wants. Of railroad material 9200 tons is listed for this week, and is comprised of the following lots: Chicago, Burlington & Quincy, 2700 tons; Great Northern, 5000 tons; Chicago, St. Paul, Minneapolis & Omaha, 1500 tons. Practically all this tonnage is tributary to the Western market and will test its power of assimilation. We quote, per gross ton, f.o.b. Chicago:

Old Iron Rails.....	\$20.25 to \$20.75
Old Steel Rails, rerolling.....	16.75 to 17.25
Old Steel Rails, less than 3 ft.....	17.00 to 18.00
Relaying Rails, standard sections, subject to inspection.....	26.00 to 28.00
Old Car Wheels.....	24.50 to 25.00
Heavy Melting Steel Scrap.....	14.75 to 15.25
Frogs, Switches and Guards, cut apart.....	15.50 to 16.00
Mixed Steel.....	11.00 to 11.50

The following quotations are per net ton:

Iron Fish Plates.....	\$16.75 to \$17.00
Iron Car Axles.....	23.50 to 24.00
Steel Car Axles.....	20.00 to 20.50
No. 1 Railroad Wrought.....	14.50 to 15.00
No. 2 Railroad Wrought.....	13.50 to 14.00
Railway Springs.....	14.50 to 15.00
Locomotive Tires, smooth.....	17.50 to 18.00
No. 1 Dealers' Forge.....	12.25 to 12.75
Mixed Busheling.....	10.50 to 11.00
Iron Axle Turnings.....	10.50 to 11.00
Soft Steel Axle Turnings.....	10.50 to 11.00
Machine Shop Turnings.....	10.50 to 11.00
Cast Borings.....	8.75 to 9.25
Mixed Borings, &c.....	8.50 to 9.00
No. 1 Mill.....	9.75 to 10.25
No. 2 Mill.....	8.75 to 9.25
No. 1 Rollers, cut to Sheets and Rings.....	10.50 to 11.00
No. 1 Cast Scrap.....	16.75 to 17.25
Stove Plate and Light Cast Scrap.....	14.00 to 14.50
Railroad Malleable.....	16.00 to 16.50
Agricultural Malleable.....	14.75 to 15.25
Pipes and Flues.....	11.00 to 11.50

Metals.—The long continued practice of hand-to-mouth buying has left consumers with depleted stocks, and lower prices have brought out a little better demand for small lots. No disposition, however, is shown to anticipate requirements for two or three months ahead, as was formerly done. Copper, Lead and Spelter are weaker, but the rest of the list shows no material change. We quote as follows: Casting Copper, 16c.; Lake, 17½c. to 19c., in car lots for prompt shipment; small lots, ¼c. to ¾c. higher; Pig Tin, car lots, 39½c.; small lots, 39¼c.; Lead, Desilverized, 5c. to 5.10c., for 50-ton lots; Corroding, 6c. to 6.10c., for 50-ton lots; in car lots, 2¼c. per 100 lb. higher; Spelter, 5.45c.; Cookson's Antimony, 13c., and other grades, 12c. to 12½c.; Sheet Zinc is \$7.50 list, f.o.b. La Salle, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, 13c.; Heavy Copper, 13c.; Copper Bottoms, 12c.; Copper Clips, 13c.; Red Brass, 12c.; Red Brass Borings, 9c.; Yellow Brass, 9c.; Yellow Brass Borings, 7½c.; Light Brass, 6¼c.; Lead Pipe, 3¼c.; Tea Lead, 3¼c.; Zinc, 3¼c.; Pewter, No. 1, 22c.; Tin Foil, 27c.; Block Tin Pipe, 32c.

The American Steel Foundries has recently bought more property adjacent to its plant on Thirty-sixth street, Pittsburgh, on which it will make some large additions. These will include a 12-ton open-hearth furnace and the erection of four steel buildings, the contract for which has been placed with the McClintic-Marshall Construction Company, Pittsburgh, and also the erection of a large power plant. The Pittsburgh plant is the smallest of those operated by the American Steel Foundries, but when these improvements and additions have been completed, they will increase the capacity of this plant about 50 per cent. in the manufacture of steel castings.

Philadelphia.

PHILADELPHIA, PA., September 24, 1907.

While there is but little change to be noted in the general conditions governing the Iron and Steel market, there is a feeling prevalent that it is nearing a more stable basis. Buying in a few lines of raw and finished materials has improved to some extent. Prices, however, do not show much change. The same variation that has been in evidence for some time is to be found in selling prices of Pig Iron, the figures being dependent on the grade, the customer and how anxious the seller is to dispose of the Iron. That the production of Pig Iron will be curtailed is practically certain. At the recent meeting of the Eastern Pig Iron Association many of the producers represented stated that a number of stacks would shortly have to be blown out for urgently needed repairs. Furnaces have in some cases been kept in blast considerably beyond the usual period, when stoppages for ordinary repairs should have been made, and frequently at considerable disadvantage to the producer, which means that when these repairs are undertaken they will require a much greater period than usual to put furnace stacks in shape for further operation. In many instances furnaces are working under very desirable contracts which are now nearing completion, and furnace managers will no doubt take advantage of the present opportunity—that is before taking on any extensive contracts at present prices—to place their furnaces in good condition for the trade which will undoubtedly develop in the near future. The financial and the crop situations both appear to be in somewhat more favorable condition, and developments in the near future will no doubt depend to a great extent on the continuation of satisfactory conditions in these directions. The trade is more hopeful as to the general outlook, but while conditions as to the balance of the year are viewed in a more favorable light, there is little or nothing being done as to next year. The tendency to do business for the near future instead of for largely extended periods gains ground, and it is more than likely that business will continue to be done on this conservative basis for some time at least.

Pig Iron.—There is a somewhat better feeling regarding the general situation in the Pig Iron market. Not that sales have been large, or that there has been any particular change in prices, but buyers appear to be fairly well satisfied to do business at prevailing figures, although the tonnage taken, except in Pipe Irons, has in most cases been small and covers only the immediate needs of the consumers. Some fair tonnages of Pipe Irons were recently closed. These aggregated about 10,000 tons, of which some was taken at close to \$19, while other lots sold nearer to \$18, dependent entirely on the grade of Iron furnished. The city of Philadelphia placed a contract a few days ago for 2354 tons of 48-in. cast iron water pipe at \$32.35, with a local concern, but it is understood that none of the above Iron was sold to cover this contract. While actual prices on the different grades of Pig Iron are hard to quote with accuracy, the difficulty is chiefly due to the situation in which producers find themselves. In most cases furnaces have been pretty well sold up, and some grades of Iron, particularly Foundry Irons, are almost entirely unavailable for delivery during the remainder of the year. In other cases, however, the production of furnaces on some grades has not been fully taken, and a good tonnage is still for sale, and it is such cases that make the matter of giving accurate quotations difficult. In other words, while it may be impossible to get some grades of No. 2 X Foundry for delivery during the remainder of the year at \$21.25, at which some lots of 100, 200 and 500 tons have been recently sold, it is still possible to get this grade of Iron, but of a different make, at \$20.50, and if a firm offer for a round lot were made by a good customer there is no doubt but that from 25c. to 50c. a ton better could be done. Under such circumstances the range in the price of Foundry Iron is much greater than is usually the case. Basic Iron has been quiet. The larger consumers have practically covered for their immediate needs, it is said, and not much activity from buyers in this locality is anticipated in the immediate future. Some little tonnage has been taken, however, for delivery during the early part of next year at prevailing prices. Mill Irons have not been very active. There has been some little inquiry from the mills, but no business of any quantity has been done. Some small lots have been sold in the cheaper grades of this Iron, at prices said to be close to \$18.25, delivered. Sales of Low Phosphorus Iron have been small. This grade is pretty well sold up, and but little is to be had for early delivery, and what Iron is taken brings, as a rule, the full price. Small tonnages, taken principally to piece out customers' requirements, have been sold recently at \$27.75, delivered. There seems to be but little interest taken in buying Iron for anything beyond the requirements for the balance of the year. Inquiries have been on the market, largely in the effort to get a line on probable prices for next year's delivery, but sellers are not inclined to commit themselves, so that no business of any volume for 1908 delivery has yet been done. The following would be about the range of

September 26, 1907

THE IRON AGE

Pittsburgh.

prices for deliveries in buyers' yards, eastern Pennsylvania and adjoining territory, for the remainder of the year:

No. 2 X Foundry.....	\$20.25 to \$21.25
Gray Forge.....	18.25 to 19.00
Basic.....	18.75 to 19.25
Low Phosphorus.....	27.25 to 27.75

Ferromanganese.—Some business, principally for delivery covering the remainder of this year and the early portion of next year, has been reported, sales covering some 1500 tons being taken at around \$56. Outside of this practically no business has been done. Prices are unchanged, \$57 to \$58 being named for the last quarter, and \$55 to \$56 for delivery during the first half of 1908.

Steel.—There is a little better feeling in the market for Steel, and buyers appear to be more inclined to place business, although in small lots only. Specifications are coming out fairly well on contracts, and mills are kept quite busy. Prices remain unchanged. For nearby deliveries quotations range from \$31 to \$32 for ordinary Rolling Steel, while Forging Steel is quoted at \$34.50 to \$35.50.

Plates.—There has been a fair demand for Plates, and mills are running on a comparatively good tonnage. New business has been a little more active, and orders for lots ranging from 100 to 500 tons, with one lot of 1000 tons, have been booked. The outlook for future business looks better, and prices are firm as follows:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel.....	1.85	1.90
Flange or Boiler Steel.....	1.95	2.05
Marine.....	2.20	2.25
Locomotive Firebox Steel.....	2.40	2.45
The above are base prices for 1/4-in. and heavier. extras apply:		
3-16 in. thick.....		\$0.10
Nos. 7 and 8, B. W. G.....		.15
No. 9, B. W. G.....		.25
Plates over 100 to 110 in.....		.05
Plates over 110 to 115 in.....		.10
Plates over 115 to 120 in.....		.15
Plates over 120 to 125 in.....		.25
Plates over 125 to 130 in.....		.50
Plates over 130 in.....		1.00

Structural Material.—There seems to be a better demand for Structural Material, although the size of individual orders is not very large. A miscellaneous business, which in the aggregate reaches a very fair tonnage, keeps mills fully occupied. Prices continue unchanged, 1.85c. to 2c. being quoted, according to specifications.

Bars.—The market for Bars has been rather dull, although there are indications which point to business in the near future. Best Refined Iron is quoted at 1.75c. to 1.80c., the inside quotation for good tonnage and desirable specifications. Steel Bars are quoted at 1.85c., Philadelphia, but are hard to get, and prompt deliveries command a slight premium.

Sheets.—The demand has not been very aggressive and new orders do not come out promptly. Specifications on old orders are being received in fairly good quantity, and mills keep pretty well occupied. Prices for mill shipments are as follows, a tenth extra being quoted for small lots: Nos. 18 to 20, 2.80c.; Nos. 22 to 24, 2.90c.; Nos. 25 to 26, 3c.; No. 27, 3.10c., and No. 28, 3.20c.

Old Material.—The market continues rather quiet, although there is a little more interest being shown by the mills, which are taking small tonnages to cover their immediate requirements. There has been no material change in prices, and bids and offers for deliveries in buyers' yards are about as follows:

Old Steel Rails and Crops.....	\$16.75 to \$17.25
No. 1 Steel Scrap.....	16.50 to 17.00
Low Phosphorus.....	21.00 to 21.50
Old Steel Axles.....	20.00 to 20.50
Old Iron Axles.....	27.50 to 28.50
Old Iron Rails.....	20.50 to 21.00
Old Car Wheels.....	23.00 to 23.50
Choice No. 1 R. R. Wrought.....	18.00 to 18.50
Machinery Castings.....	18.00 to 18.50
Wrought Iron Pipe.....	14.50 to 15.00
No. 1 Forge Fire Scrap.....	13.75 to 14.25
No. 2 Light Iron.....	9.50 to 10.00
Wrought Turnings.....	14.00 to 14.50
Stove Plate.....	14.50 to 15.00
Cast Borings.....	12.50 to 13.00
Grate Bars.....	14.50 to 15.00
No. 2 Light Sheet Steel.....	13.00 to 14.00

The most definite statement that has appeared concerning insurance on the Quebec bridge is that a large share of the loss will be borne by the Ocean Accident & Guarantee Corporation, Ltd., of London, England, which insured all the work of the Phoenix Iron Company both in the United States and in Canada. A representative of this company admitted that it had the risk but the amount of its liability in the recent disaster is not stated.

PARK BUILDING, September 25, 1907.—(By Telegraph.)

Pig Iron.—As far as sales go, Pig Iron continues practically lifeless. There are as yet no inquiries of any moment for Pig Iron for next year. The situation has some features of strength. Many blast furnaces in the two valleys and in the Pittsburgh District have been working badly for some time, not getting out their full quota of Iron, and the quality is below what it should be. This is due to the fact that they have been kept in blast longer than they should have been, as their product was badly needed. Some of these furnaces are now in such bad condition that they will have to go out before very long. Bessemer Iron is scarce and furnaces are behind in shipments. The market on Bessemer is firm, at \$22, Valley furnace, and it is hard to get at that price. There is nothing doing in Basic Iron, but the market seems to be a little better, and it is held at \$20.50 to \$21, Valley furnace. There is very little doing in Foundry Iron and the market is weak. A leading local consumer bought last week 500 to 600 tons of Northern No. 2 Foundry for prompt shipment at a relatively low price, said to dry for prompt shipment at a relatively low price, said to have been considerably under \$21, Valley furnace. We quote Northern No. 2 Foundry for prompt delivery and in small lots at about \$21, Valley furnace, but on a firm offer and for any considerable tonnage lower prices would be made. There is nothing doing in Forge Iron and we quote Northern Forge at \$20, Valley furnace, or \$20.90, Pittsburgh.

Steel.—There is not much Steel being sold in the open market, nearly all consumers of Billets and Sheet and Tin Bars being covered by contracts. Bessemer Billets for prompt shipment are scarce and would probably bring \$29.50, but for future delivery \$29 could be done. Open Hearth Billets are about \$31 and Sheet and Tin Bars also \$31, at maker's mill. An outside Steel interest is reported to have sold in the past week about 5000 tons of Forging Billets for forward delivery on the basis of about \$33, Pittsburgh, and we quote the market at that price.

(By Mail.)

The very favorable weather of the past two weeks or more has been particularly beneficial for late crops, particularly corn and tomatoes, and has resulted in quite a heavy Tin Plate tonnage being placed by the canners. The general assurance of fairly heavy crops means that the railroads will require all the rolling stock that they can gather to move them, and from the standpoint of sentiment the market is better this week than last. By this we do not mean that buyers are contracting ahead, for such is not the case, but the amount of new tonnage being placed in Iron and Steel for reasonably early delivery is a little larger and the feeling is more cheerful. Nothing has been heard as yet from the subcommittee of the Conference Committee representing the railroads and the Rail mills, as to what it will recommend on revised specifications, but its report is looked for before this week is out. It is expected that just as soon as the railroads commence to place orders for Rails, other consumers will do the same, and it is confidently believed that October will show a material improvement over this month in that respect. The Pig Iron market continues quiet, only sales of small lots for early shipment being made. The Steel market is fairly firm, and a Southern interest has taken contracts in the past week for a round tonnage of Axle Billets for forward delivery. New business in finished Iron and Steel is only fairly heavy, and some weakness in prices is reported, notably in Sheets and Plates, but nothing of a serious nature in this direction has developed. The Coke market is very strong, but Scrap continues weak and prices are lower.

Ferromanganese.—The market is very dull, and prices are somewhat weak. Foreign grades of 80 per cent. Ferro for prompt delivery are being offered on a basis of about \$60, Pittsburgh. For delivery over the last quarter of the year lower prices are being named.

Muck Bar.—Consumers of Muck Bar are pretty well covered ahead, and mills rolling this material have a good deal of tonnage on their books and are not actively seeking new business, with the result that the market is rather quiet. We continue to quote best grades of Muck Bar made from all Pig Iron at about \$36, Pittsburgh.

Skelp.—Little new business is being placed, but prices are fairly strong, the mills rolling Skelp still having large contracts on their books, against which buyers are specifying quite freely. We quote: Grooved Steel Skelp, 1.85c. to 1.90c.; Sheared Steel Skelp, 1.95c. to 2c.; Grooved Iron Skelp, 2.15c. to 2.20c., and Sheared Iron Skelp, 2.25c. to 2.40c., depending on sizes and widths. All these prices are f.o.b. maker's mill.

Rods.—There is not much demand for Rods, consumers being pretty well covered, but prices continue reasonably firm. We quote Bessemer Rods at \$36 and Open Hearth at about \$37, Pittsburgh.

Steel Rails.—The report of the subcommittee of the Conference Committee representing the railroads and the Rail mills is expected to be given out this week, and will recommend revised specifications and new sections of Rails which it is believed will meet the requirements of heavy rolling stock and greater speed on the railroads. This committee will report to the full committee, which will likely issue its report at once, so that it may be expected before October 1. Practically no new tonnage is being placed in Steel Rails, but the Carnegie Steel Company now has on its books orders for nearly 400,000 tons of Standard Sections for delivery in this and next year, or about six months' work. The company is operating only one plant on Rails at present, this being the Edgar Thomson mill, which is making 65,000 tons of Standard Sections per month. The company expected to have to put its Youngstown mill on Rails for a time to help out on some of its contracts, but instead made an arrangement by which the Lorain mill of the National Tube Company has been put on Rails and will roll about 20,000 tons for the Carnegie Company. This will obviate the necessity of putting the Youngstown mill on Rails, and it will be kept on Billets and Bars for the rest of this year, unless some unexpected situation should develop. There is good business going in Light Rails, the Carnegie Company having taken orders in the past week for over 2000 tons. We quote Light Rails as follows: \$33 to \$34 for 20 to 45 lb.; \$34 to \$35 for 16-lb., and \$35 to \$36 for 12-lb., at mill. Angle Splice Bars are held at 1.65c., and Standard Section Rails at \$28, at mill.

Plates.—The tonnage of new orders being placed in Plates is relatively small as compared with the enormous demand of several months ago. However, the leading local mills still have a very heavy tonnage on their books, against which buyers are specifying freely, and the output and shipments of Plates are as heavy now as at any time this year. Prompt deliveries on Universal Plates can be had more readily than on Sheared Plates, the leading mills still being considerably behind on the latter. Prices of Plates are fairly strong, but are not as firm as some time ago. We quote: Tank Plates, $\frac{1}{2}$ -in. thick, $\frac{3}{4}$ -in. up to 100 in. wide, 1.70c., base, at mills, Pittsburgh. Extras over this price are as follows:

	Extra per 100 lb.
Gauges lighter than $\frac{1}{4}$ -in. to and including 3-16-in.	
Plates on thin edges.....	\$0.10
Gauges Nos. 7 and 8.....	.15
Gauge No. 9.....	.25
Plates over 100 to 110 in.....	.05
Plates over 110 to 115 in.....	.10
Plates over 115 to 120 in.....	.15
Plates over 120 to 125 in.....	.25
Plates over 125 to 130 in.....	.50
Plates over 130 in.....	1.00
All sketches (excepting straight taper Plates varying not more than 4-in. in width at ends, narrowest end being not less than 30 in.).....	.10
Complete Circles.....	.20
Roller and Flange Steel Plates.....	.10
"A. B. M. A." and ordinary Firebox Steel Plates.....	.20
Still Bottom Steel.....	.30
Marine Steel.....	.40
Shell Grade of Steel is abandoned.	

TERMS.—Net cash 30 days. Pacific Coast base, 1.60c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes 14 in. wide down to 6 in. of Tank, Ship or Bridge quality.

Structural Material.—The contract for the Oliver office building in this city has not yet been given out, but as all bids have been in for nearly two weeks, this job, which will take about 11,000 tons of Steel, is expected to be given out in a short time. Inquiries are reported to be somewhat better, and the Structural concerns are entering a fair amount of tonnage. We quote: Beams and Channels, up to 15 in., 1.70c.; over 15 in., 1.80c.; Angles, 3 x 2 x $\frac{1}{4}$ in. thick, up to 6 x 6 in., 1.70c.; 8 x 8 and 7 x 3 $\frac{1}{2}$ in., 1.80c.; Zees, 3 in. and larger, 1.70c.; Tees, 3 in. and larger, 1.75c.; Bulb Angles and Deck Beams, 2c. Under the Steel Bar card, Angles, Channels and Tees under 3 in. are 1.70c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Sheets.—Only a moderate amount of new tonnage is being placed, and some unevenness in prices on light gauges of Black Sheets and on Roofing Sheets is reported. Whatever cutting in prices is being done is not of a serious nature, and is not being met by the leading mills, which are still pretty well filled up on contracts, against which buyers are specifying freely. Reasonably prompt deliveries on Black Sheets can be had, but on Blue Annealed and Galvanized the mills are still considerably behind. We quote: Blue Annealed Sheets, No. 10 gauge and heavier, 1.85c.; Nos. 11 and 12, 1.90c.; Nos. 13 and 14, 1.95c.; Nos. 15 and 16, 2.05c.; Box Annealed, Nos. 17 to 21, 2.35c.; Nos. 22 to 24, 2.40c.; Nos. 25 and 26, 2.45c.; No. 27, 2.50c.; No. 28, 2.60c.; No. 29, 2.75c.; No. 30, 2.85c. We quote Galvanized Sheets as follows: Nos. 10 and 11, 2.65c.; Nos. 12 and 14, 2.75c.; Nos. 15 and 16, 2.85c.; Nos. 17 to 21, 3c.; Nos. 22 and 24, 3.15c.; Nos. 25 and 26, 3.35c.; No. 27, 3.55c.; No. 28, 3.75c.; No. 29, 4c., and No. 30, 4.25c. We quote No. 2 gauge Painted Roofing Sheets at \$1.85 per square, and Galvanized Roofing Sheets, No. 28 gauge, \$3.25 per square, for 2-in.

corrugations. These prices are for carload lots, jobbers charging the usual advances.

Tin Plate.—Quite a heavy tonnage in Bright Plate has been placed in the last two or three weeks, and the leading Tin Plate mills now have a fair tonnage on their books for delivery over the balance of this year. There will be an average crop of corn and tomatoes, the weather of the past two weeks having been especially favorable for corn, and the amount of tonnage placed by the canners so far is really larger than expected. The market is firm, and there have been no official intimations whatever of any change in price. We quote \$3.90 for 100-lb. Cokes, 14 x 20, f.o.b. Pittsburgh, terms 30 days, less 2 per cent. off for cash in 10 days, on which price a rebate of 5c. a box is allowed for carload and larger lots.

Bars.—A moderate tonnage is being placed in both Iron and Steel Bars. New business in Iron Bars has been a little heavier in the last week or two, some fair sized orders from wagon makers and other consumers having been placed. The mills rolling Iron Bars are able to make fairly prompt deliveries, and this is probably inducing some former consumers of Steel Bars to take Iron. Buyers are specifying against contracts on Steel Bars quite freely, but not as heavy as some time ago. The market is firm, and we quote Iron Bars at 1.70c., Pittsburgh, which, however, would likely be shaded about \$1 per ton on desirable orders. Steel Bars are 1.60c., base, Pittsburgh, with slight premiums still being paid to some mills that can ship out promptly.

Spelter.—The bottom seems to have dropped out of the Spelter market, probably in sympathy with Copper, and prices have declined \$4 to \$5 per ton and are very weak. Prime grades of Western Spelter can be bought as low as 4.80c., St. Louis, and it is likely that 4.75c. could be done, the freight rate to Pittsburgh being 12 $\frac{1}{2}$ c.

Merchant Steel.—Tonnage being shipped out by the mills continues heavy, but is mostly on old contracts against which consumers are specifying freely. The amount of new business being placed is relatively light, and is mostly in small lots. There is no change in prices, and we quote: Smooth Finished Machinery Steel, 1.85c. to 2c., depending on quality; Flat Sleigh Shoe, 1.65c. to 1.75c.; Cutter Shoe, 2.15c. to 2.20c.; Toe Calk Steel, 2.10c. to 2.15c.; Railroad Spring Steel, 1.75c. to 1.80c.; Crucible Tool Steel, 6c. to 8c. for ordinary grades, and 10c. and upward for special grades. Shafting, 60 per cent. off in car lots; 55 per cent., less than car lots, Pittsburgh.

Railroad Spikes.—Very little new business is being placed in Railroad Spikes, the long expected buying movement of the railroads not having yet started. We quote standard sizes at \$2, and the smaller sizes at \$2.15 per 100 lb., Pittsburgh, but if any considerable business was offering it is probable these prices would be shaded.

Merchant Pipe.—A fair amount of new tonnage is being placed, but the output of the mills rolling Merchant Pipe is much heavier than the new demand, so that the mills are gradually catching up on back deliveries, but still have enough on their books to keep up them pretty well filled for the rest of this year at least. The Philadelphia Company has placed an order for 7 miles of 8-in. plain ends Line Pipe with the Mark Mfg. Company, Columbus, Ohio. Discounts on Steel Pipe are as follows:

Merchant Pipe.

	Jobbers, carloads, Steel.	Galv.
	Black.	%
$\frac{1}{8}$ to $\frac{1}{4}$ in.....	.65	49
$\frac{3}{8}$ in.....	.67	53
$\frac{1}{2}$ in.....	.69	57
$\frac{3}{4}$ to 6 in.....	.73	63
7 to 12 in.....	.70	55
Extra strong, plain ends:		
$\frac{1}{8}$ to $\frac{1}{4}$ in.....	.58	46
$\frac{1}{2}$ to 4 in.....	.65	53
$\frac{1}{2}$ to 8 in.....	.61	49
Double extra strong, plain ends:		
$\frac{1}{2}$ to 8 in.....	.54	43

To the large trade all above discounts are subject to 1 point on the base, and 5 per cent. on the net.

Official discounts on Iron Pipe, which are shaded 2 points or more to the large trade, are as follows, f.o.b. Pittsburgh:

Standard Genuine Iron Pipe.

	Black.	Galv.
	%	%
$\frac{3}{8}$ to 6 in.....	.67	57
$\frac{1}{2}$ in.....	.62	50
$\frac{3}{4}$ in.....	.60	42
$\frac{1}{2}$ and $\frac{1}{4}$ in.....	.58	42
7 to 12 in.....	.62	47
Extra Heavy Iron Pipe, Plain Ends.		
$\frac{1}{2}$, $\frac{3}{4}$ and $\frac{1}{2}$ in.....	.62	40
$\frac{1}{2}$ to 4 in.....	.59	47
$\frac{1}{2}$ to 8 in.....	.55	42

Boiler Tubes.—The demand for Locomotive Tubes is light and for Merchant Tubes is only moderate. It is believed that just as soon as the railroads and the Rail mills are agreed upon the important question of the proper specifications of Steel Rails, the demand for Locomotive Tubes will

very quickly show betterment. Discounts on Merchant Tubes are as follows:

Boiler Tubes.		Iron.	Steel.
1 to 1½ in.	.....	42	47
1½ to 2¼ in.	.....	42	59
2¼ in.	.....	47	61
2½ to 5 in.	.....	52	65
6 to 13 in.	.....	42	59
2½ in. and smaller, over 18 ft. long, 10 per cent. net extra.			
2½ in. and larger, over 22 ft. long, 10 per cent. net extra.			

Iron and Steel Scrap.—New tonnage in Scrap being contracted for by consumers is still confined mostly to small lots for early shipment. Large consumers of Scrap continue to believe that prices will be lower, and that nothing will be gained by buying ahead in the present condition of the market. Dealers quote about as follows: Heavy Steel Scrap, \$17 to \$17.25, for Pittsburgh, Steubenville or Sharon delivery; No. 1 Railroad Wrought Scrap, \$17.50 to \$17.75; Re-rolling Rails, \$17.25 to \$17.50; No. 2 Wrought Iron Scrap, \$17; No. 1 Busheling Scrap, \$16 to \$16.50; No. 2, \$13; Bundled Sheet Scrap, \$14.50 to \$14.75; Low Phosphorus Melting Stock, \$21 to \$21.25; Old Steel Rails, short pieces for Open Hearth use, \$17 to \$17.25; No. 1 Cast Scrap, \$19.50 to \$20; Cast Iron Borings, \$12.75 to \$13; Old Car Wheels, \$24; Steel Axles, \$21.50 to \$21.75; Stove Plate, \$14.75 to \$15; Grate Bars, \$15 to \$15.25. All above prices are per gross ton, f.o.b. buyer's mill, Pittsburgh, unless otherwise stated. We note sales as follows: 600 to 700 tons of Heavy Steel Scrap on the basis of about \$17, Pittsburgh; 150 tons of Turnings at \$13.50; 500 tons of Wrought Iron Scrap at \$17.75 to \$18; 200 tons of Heavy Cast Scrap at about \$17.75; 300 tons of No. 1 Cast Scrap at \$19.75, and 100 tons of Cast Iron Borings at about \$13. We also note a sale of 200 tons of Old Iron Rails on the basis of about \$20.50, Pittsburgh, all these sales being f.o.b., Pittsburgh, and in gross tons.

Coke.—One or two leading consumers of Furnace Coke have come in the market in the past week for a round tonnage in the last three months of this year and over all of next year. The contract has not yet been placed, but a number of Coke makers have sent in prices which are understood to range from \$2.85 up to as high as \$3, Pittsburgh. It is also stated that a leading Connellsville Coke plant has sold its entire output of Furnace Coke for next year to another producer, but this has not been confirmed. One or two leading makers of Coke have recently sent a large number of their Coal miners up to the Ore regions to mine Ore, and this has caused a slight scarcity of labor at some of the larger plants. Strictly Connellsville Coke for prompt shipment is held at \$2.90, and it is believed will reach \$3 before very long. Best grades of Connellsville 72-hr. Foundry Coke are held at \$3.25 to \$3.50 per ton, at oven. The output of Coke continues heavy, the Upper and Lower Connellsville regions having made last week 425,423 tons.

Birmingham.

BIRMINGHAM, ALA., September 23, 1907.

Pig Iron.—The buying movement reported in other sections has certainly not reached this district yet. The majority of the trading during the week just closed has been on resale Iron at prices considerably below what the furnaces are asking. The quotation of \$18.50 for No. 2 is still being adhered to by the larger interests, although they deny that there is now any understanding between them by which an agreed price is to be maintained. The fact that all the furnaces have Iron sold at much higher prices than are now ruling would in itself be sufficient to cause them to maintain the present prices until such time as their stocks become so heavy that it is necessary for them to reduce. At present the only Iron accumulating on furnace yards is off grades, nearly every producer in the district being behind in shipments on the higher grades of Foundry Iron. Already complaint is being heard as to scarcity of cars, it having started earlier this year than usual, and this is being relied upon to assist in holding prices up for the balance of this year. One concern reports a shortage of 3000 tons on this month's shipments, due to inability to secure cars. Every effort is being made to get as much Iron as possible in transit this month, as it being the last in the quarter buyers have the privilege of canceling all third-quarter Iron not shipped out this month. As all Iron sold for this delivery was at good prices, producers are naturally trying to avoid as much cancellation as possible. Some requests are being received to withhold shipments, but as yet these have not reached sufficient proportions to cause any uneasiness. So far as buying for next year's delivery is concerned, not a single order has been reported for some time, nor are many covering for requirements for the entire balance of this year. A number of buyers are buying each week only their requirements for that week, something which they have not done for a long time. All are apparently endeavoring to pursue a conservative course, and it is pretty certain that those who have been caught on high priced Iron for the remainder of this year are not inclined to speculate very much on Iron for next year's delivery, especially in the face of a declining market.

Cast Iron Pipe.—Los Angeles, Cal., will open bids Sep-

tember 30 for about 6000 tons of Water Pipe and specials. This is the only contract now in sight for large tonnage. Small orders, while still being received, are not as numerous as heretofore, and the Pipe market is somewhat more quiet than it has been previously this year. Operations continue at full capacity, and it is understood that practically all the foundries here have ample orders to keep them going the balance of the year. Prices on small lots of Water Pipe are approximately as follows per net ton, f.o.b. cars here: 4 to 6 in., \$32 to \$33; 8 to 12 in., \$31 to \$32; over 12 in., average \$30, with \$1 per ton extra for Gas Pipe. On large municipal contracts these prices are probably slightly shaded.

Old Material.—While consumers are not making contracts in advance of requirements, they are buying more freely for current consumption, which is causing more activity in the Scrap market than for some weeks. Stocks are about normal and prices are being well maintained. Dealers' quotations are about as follows per gross ton, f.o.b. cars here:

Old Iron Rails.....	\$22.00 to \$22.50
Old Iron Axles.....	18.50 to 19.00
Old Steel Axles.....	17.00 to 17.50
Old Car Wheels.....	20.50 to 21.00
No. 1 Railroad Wrought.....	17.50 to 18.00
No. 2 Railroad Wrought.....	12.50 to 13.00
No. 1 Country Wrought.....	14.50 to 15.00
No. 2 Country Wrought.....	11.50 to 12.00
Wrought Pipe and Fines.....	13.00 to 13.50
Railroad Malleable.....	14.00 to 14.50
No. 1 Steel.....	14.00 to 14.50
No. 1 Machinery Cast.....	15.50 to 16.00
Stove Plate and Light Cast.....	12.00 to 12.50
Cast Borings.....	8.25 to 8.75

Cleveland.

CLEVELAND, OHIO, September 24, 1907.

Ore shipments have fallen off somewhat owing to heavy rains that seriously interfered with work in open pit mines and caused a decrease in the movement of Ore from the mines to the ports at the head of the lakes. As a result of the light receipts of Ore at the upper lake ports, boats are being delayed considerably in waiting for cargoes. The labor situation in the mines shows little improvement, according to reports received by local shippers, although some men who left to work in the harvest fields have returned to the mines. Owing to the unfavorable weather and labor conditions and to the fact that there was little Ore left in the stock piles at the first of the month to help out the month's tonnage, the September Ore shipments will fall far below those of August. According to conservative estimates, the total Ore movement this year will be about 40,000,000 tons, although some place the amount a little higher than that. While there will be considerable Ore shortage this season, based on the quantity of Ore sold, it is believed that the supply will still be sufficient to meet requirements, so that there will not be a real scarcity. Although there are some inquiries for Ore, they are not more numerous than they were. Anything for sale, however, is quickly picked up at the established prices. Considerable Ore is now being piled on the docks at Lake Erie ports. Ore prices are as follows at Lake Erie docks, per gross ton: Old Range Bessemer, \$5; Mesaba Bessemer, \$4.75; Old Range Non-Bessemer, \$4.25; Mesaba Non-Bessemer, \$4; Siliceous Bessemer, \$2.75; Siliceous Non-Bessemer, \$2.35 to \$2.60.

Pig Iron.—Prices are weaker, and local furnaces are now asking \$22 as the maximum price, at furnace, for No. 2 Foundry Iron for spot shipment, or for the balance of the year. While the demand for spot Iron is not heavy, being mostly for quite small lots, it shows a slight improvement, and the furnaces in this district seem to be disposing of about all the Foundry Iron they have available for quick shipment. An encouraging sign is the fact that requests from foundries that shipments be withheld for a few weeks are less numerous than they were during August. A local interest reports the sale of 2000 tons of No. 2 Foundry Iron at western Pennsylvania furnace at \$20.50 for spot delivery, or \$1 a ton lower than recent sales by the same furnace. There are reports of spot No. 2 Foundry Iron being offered as low as \$20, Valley furnace. Other local interests, however, are holding Foundry Iron at \$21.50 and \$22 for prompt shipment, and for the balance of the year. Many foundries in this district have not covered for the last quarter, and an improvement in the market is expected at the first of the month. There is scarcely an inquiry at present, however, for last quarter Iron, and the indications now are that consumers will buy spot Iron, as they need it during the balance of the year instead of covering for the entire quarter. Only one inquiry is noted during the week for Foundry Iron for next year. In response to an inquiry from the East, a local interest made a quotation of \$21, at furnace, for No. 2 Foundry for the first quarter. A local Basic interest, which has its output sold until late in December, reports that its consumers are urging prompt shipments of Basic Iron on contract. Quotations for the balance of 1907, f.o.b. Cleveland, are as follows:

Bessemer.....	\$22.90
Northern Foundry, No. 1.....	\$22.00 to 22.50
Northern Foundry, No. 2.....	21.50 to 22.00
Northern Foundry, No. 3.....	21.00 to 21.50
Gray Forge.....	20.90

Coke.—The demand for Furnace Coke on contract continues good, but not many new orders are being placed. Foundry Coke is also in good demand and some good sized contracts have been placed during the week for last quarter, first quarter and first half delivery. Fairly good deliveries are being made on contracts. Prices are a little firmer. We quote Connellsville Furnace Coke at \$3 to \$3.25, at oven, and 72-hr. Foundry Coke at \$3.25 to \$3.50, at oven.

Finished Iron and Steel.—Very little new business is being placed and specifications on contracts are light, although some mills report an improvement as compared with a week ago. The warehouse business is keeping up satisfactorily, and a fair amount of current business is being received by the mills, but, above all, the new business is in small orders of not over 100 tons. The American Shipbuilding Company will close a contract this week for another lake boat for 1907 delivery. It will require about 2500 tons of Plates and Structural Material. There is also some new tonnage in sight in Bars and Structural Material, for which it is expected that contracts will be closed soon. The stringency of the money market has had the effect of holding up for the time being several traction projects and has curtailed the demand for Rails from that source. One inter-urban company has so far been unable to market its bonds after a Rail order was placed and has asked the mill not to make deliveries on the order until the financing of the road is completed. The demand for Iron Bars is only fair, but local mills have enough orders to keep them busy. Local mills quote Iron Bars at 1.65c., Cleveland, and other mills are asking 1.60c., Pittsburgh. We quote Steel Bars at 1.70c., Cleveland, for carloads, with half extras. Deliveries on Steel Bars are slowly improving and the most of the mills can make shipments in four to six weeks. The Structural situation is easier, but there is a fair demand for small lots. Many Plate mills can now make reasonably prompt deliveries, and no premium business is being done. The demand is light. We quote Beams and Channels at 1.80c., base, Cleveland, for carload lots, and Plates, 1/4-in. and heavier, carload lots, 1.80c. Sheet deliveries are gradually growing better and the demand is light. The only business is in small lots. Warehouse prices remain stationary. We quote Steel Bars out of warehouse at 1.90c. to 1.95c., and Iron Bars at 1.95c. to 2c. Jobbers' prices on Sheets are as follows: Blue Annealed, No. 10, 2.30c.; No. 28, One Pass Cold Rolled, 3.05c.; No. 28, Galvanized, 4.05c. Beams and Channels are 2.10c. to 2.15c., base, out of stock. The warehouse price on Boiler Tubes, 2 3/4 to 5 in., is 64 per cent. discount, and on Black Merchant Iron Pipe, base sizes, 67 per cent. discount.

Old Material.—The market is absolutely dead. The little demand that there was for Scrap for immediate needs has disappeared, and dealers with Old Material for sale are unable to get an offer from consumers. Old contracts with dealers have pretty well expired, but no new contracts are being made. While the mills continue in full operation, they all seem to have enough Scrap on hand to supply them for the time being, and are not disposed to buy until they are compelled to. Prices show a tendency toward further weakness. Quotations, which are nominal, are unchanged from a week ago. Dealers' prices to the trade per gross ton, f.o.b. Cleveland, are as follows:

Old Steel Rails.....	\$16.50 to \$16.75
Old Iron Rails.....	22.00 to 22.50
Steel Car Axles.....	21.50 to 22.00
Old Car Wheels.....	23.00 to 24.00
Relaying Rails, 50 lb. and over.....	27.50 to 28.00
Relaying Rails, under 50 lb.....	30.00 to 31.00
Heavy Melting Steel.....	16.00 to 16.50
Railroad Malleable.....	17.75 to 18.25
Agricultural Malleable.....	15.50
Light Bundled Sheet Scrap.....	13.50 to 14.00

The following quotations are per net ton, f.o.b. Cleveland:

Iron Car Axles.....	\$25.00 to \$26.00
Cast Borings.....	10.00 to 10.50
Iron and Steel Turnings and Drillings.....	10.50 to 11.00
Steel Axle Turnings.....	13.00 to 14.00
No. 1 Busheling.....	14.00 to 15.00
No. 1 Railroad Wrought.....	16.00 to 16.50
No. 1 Cast.....	17.00 to 17.50
Stove Plate.....	14.00 to 14.50
Bundled Thin Scrap.....	10.00

Cincinnati.

FIFTH AND MAIN STS., Sept. 24, 1907.—(By Telegraph.)

No less difficult to forecast, with little to chronicle of present movement, is the existing situation in the Iron market. The expected buying movement has certainly not materialized. There is no inquiry for 1908 Iron, nothing is being sold for the first quarter or half, and sales agents are not quoting a price. The feelers put out earlier in the year, and which resulted in some sales at \$17.50 for No. 2 for the first quarter, are accepted tentatively for lack of something better to fix a price for that grade, and furnacemen at Birmingham interviewed during the week seem inclined to accept this figure or even \$17 as a firm basis for next year's first quarter requirements. As to the last quarter of 1907, melters are still buying gingerly and only as Iron is needed. The only difference that it seems possible to report in the

attitude of the melters toward the end of the year is that inquiries are more frequent, which summed up means the tone is better, with the volume of transactions but slightly improved. A prominent authority, when asked what surplus Iron would be carried over by the furnaces into the new year, replied not a pound of Northern and very little if any Southern, referring to No. 2. Manufacturers in the interior of the State are agitating a movement to secure a reduction in the Pig Iron freight rate, averring that the new tariff that was effective April 1 is oppressive. The receivers' and shippers' associations of these cities are co-operating with the manufacturers. The car shortage, which is always a feature of the fall, is more marked at this time than ordinarily, and even with some of the conservative ones speculation as to what will happen if the melters stay out two or three weeks borders on the sensational, for the cotton movement is unusually heavy as well as other products.

Pig Iron.—While the disposition of buyers to come into the market is somewhat more pronounced, the experience of the week gives little license for elation. The melter who is in the market most frequently is still feeling for a lower price than \$18.50 on a 500-ton lot of No. 2 soft for immediate use. It is reported that the Pipe people are buying some small bargain lots, but not enough to affect the market. It is difficult to quote a selling price for Gray Forge and Mottled, as nobody seems to be interested. The predominance of these low grades and the lack of use for them have created for them practically a buyer's market. While it is generally admitted that resale Iron has practically disappeared, there have been some small lots come to light during the week which may have aided to further delay spot buying at the present rate, which seems now to be fixed for the remainder of the year at \$18.50 for No. 2. The labor troubles in the South, coupled with the car shortage conditions, have combined to accentuate the spirit of independence which has seemed to possess furnacemen, and a drop of any importance for last quarter deliveries is one of the remote possibilities rather than a probability, according to leading local sales agents. It is generally conceded that there must be a buying movement begun not later than November to cover for first quarter requirements, and if the buying for the last quarter's needs is deferred much longer some melters will probably be caught short. In the subjoined table prices are given for Cincinnati delivery, the freight rate from Birmingham being \$3.25 and from the Hanging Rock District \$1.20.

Southern Coke, No. 1.....	\$22.25 to \$22.75
Southern Coke, No. 1.....	21.75 to 22.25
Southern Coke, No. 3.....	21.25 to 21.75
Southern Coke, No. 4.....	20.25 to 20.75
Southern Coke, No. 1 Soft.....	22.25 to 22.75
Southern Coke, No. 2 Soft.....	21.75 to 22.25
Southern Coke, Gray Forge.....	18.75 to 19.25
Southern Coke, Mottled.....	18.25 to 18.75
Ohio Silvery, 8 per cent. Silicon.....	30.20 to 30.70
Lake Superior Coke, No. 1.....	22.70 to 23.20
Lake Superior Coke, No. 2.....	22.20 to 22.70
Lake Superior Coke, No. 3.....	21.70 to 22.20

Car Wheel Irons.

Standard Southern Car Wheels.....	\$29.25 to \$29.75
Lake Superior Car Wheels.....	27.70 to 28.00

Coke.—The Coke market is in a less satisfactory condition from the buyer's viewpoint and in the matter of deliveries than the Iron market. It is too early for a pronounced car shortage to show up, as has been the case, and agents are having great difficulty in making spot deliveries. Wise County is quoted firm at \$3.75 at oven, with none to spare for prompt delivery; Pocahontas Foundry, \$3 to \$3.25, and Furnace, \$2.50 to \$2.75, at oven; Connellsville Foundry, spot, \$3.30 to \$3.50; contract, \$3.50.

Old Material.—Inactivity in all departments of the Scrap market, so far as new interest is concerned, users buying only for actual requirements. The large dealers have still the appearance of great activity, owing to the filling of contracts on the books from months back. Dealers quote, f.o.b. Cincinnati, about as follows:

No. 1 R. R. Wrought, net ton.....	\$14.50 to \$15.00
Cast Borings, net ton.....	8.50 to 9.00
Steel Turnings, net ton.....	9.50 to 10.00
No. 1 Cast Scrap, net ton.....	15.00 to 15.50
Burnt Cast and Wrought, net ton.....	9.50 to 10.00
Old Iron Axles, net ton.....	22.00 to 23.00
Old Iron Rails, gross ton.....	20.00 to 21.00
Old Steel Rails, long, gross ton.....	16.00 to 16.50
Relaying Rails, 56 lb. and up, gross ton.....	27.50 to 28.00
Old Car Wheels, gross ton.....	22.50 to 23.50
Mining Car Wheels, gross ton.....	12.00 to 13.00
Low Phosphorus Scrap, gross ton.....	19.00 to 19.50

Finished Iron and Steel.—Better deliveries from the mills have invested the dealers with a spirit of optimism, and the summer quiet may be said to be over. There is a general awakening, and while there have been no advances, there is distinctly a better tone. Dealers quote, f.o.b. Cincinnati, as follows: Iron Bars, carload lots, 1.80c., with half extras; small lots from store, 1.95c., base, full extras; Steel Bars, carload lots, 1.75c., base, half extras; small lots from store, 1.85c., base, full extras; Base Angles, carload lots, 1.85c.; small lots from store, 2.10c.; Beams, Channels and Structural Angles, 1.85c., base; small lots from store, 2.25c.; Plates, 1/4-in. and heavier, carload lots, 1.85c.; small lots from store, 2.10c.; Sheets, No. 16, carload lots, 2.20c.; small

lots from store, 2.55c.; No. 14, carload lots, 2.10c.; small lots from store, 2.45c.; Steel Tire, 4-in. or heavier, carload lots, 1.95c., base; Plates, 3-16 and No. 8, carload lots, 1.95c.; small lots from store, 2.20c.; Sheets, No. 10, 2c., carload lots; 2.30c. from store; Sheets, No. 12, 2.05c., carload lots; 2.40c. from store; Light Sheets, Black, No. 28, carload lots, 2.75c.; Galvanized, No. 28, 3.90c.

Metal Market.

NEW YORK, September 25, 1907.

Pig Tin.—The market during the week has been dull and prices have moved in a less erratic fashion than last week, the range for 5-ton lots during the week having been as follows:

	Cents.
September 18.....	37.25
September 19.....	36.85
September 20.....	37.00
September 23.....	37.35 to 37.45
September 24.....	37.25 to 37.45
September 25.....	37.15

There has been some attempt to manipulate the London market, but efforts in that direction have not been successful. Buyers are holding off in anticipation of the Banca sale, which occurs to-morrow, and it is rumored that the leading consuming interests in this country will buy largely, as that is the only market in which they can buy without putting up the price. The arrivals so far this month have been small, aggregating 2080 tons, and there are afloat for American ports 1590 tons. The London market closes firm to-day at £169 for spot and £166 for futures.

Copper.—The announcement made September 23 that the price of Electrolytic Copper from the leading selling interest would be 15c., delivered 30 days, stimulated no more buying than its previous announcements at 22c., 18c. and other figures. Outside interests, while cutting this price to some extent, are not offering Copper at more than 1/4c. or 1/2c. lower, consequently the range for Electrolytic would be 14.75c. to 15c. Offerings made in Europe at 14.75c., f.o.b. New York, have failed to attract any business. Lake Copper can be had at 15c. to 15.25c., and Casting Grades at 14.50c. to 14.75c. There have been occasional inquiries from domestic consumers, but buyers express more or less unanimity of opinion that the demand for their products has so fallen off that they cannot see their way clear to enter the market, except for an occasional carload. Orders for lots, such as these, are being eagerly solicited, even by companies who not so very long ago announced their intention of holding the price at considerably higher levels. More or less definite information has been secured during the week regarding the contemplated curtailment of production, but this will not become effective for from 60 to 90 days, as it takes that time to produce merchantable Electrolytic Copper, after the Ore is out of the mines. After all, it is not so much a question of overproduction, as it is underconsumption. The forerunner of this was known early in the year when the Bell Telephone people failed to secure the necessary funds for contemplated construction, except on onerous terms, and forthwith withdrew their inquiries for Wire. Regarding the shut-down, there are many who openly state that their business is to mine Copper, and whether they sell it for one price or another they are going to sell it, as the market demands and at the market price. Of course, there will be no special attempt to stimulate production, but it costs considerable money to keep a mining property in an idle or half idle state. Then, too, some of the producers are perfectly willing to have the curtailment appear larger than it really will be. The quotations for Copper in London this afternoon are £66 for both spot and futures. Best Selected is held at £70 10s. The exports so far this month aggregate 11,935 tons.

Pig Lead.—Indications are not wanting that the leading interest is attempting to curtail the production of Lead and prices rule somewhat firmer, at 4.75c., New York, and 4.55c. to 4.57 1/2c., St. Louis.

Spelter.—The market is considerably firmer, and there have been several inquiries for large amounts. The lowest offerings yesterday were at 5.10c., St. Louis, but these were subsequently withdrawn, and to-day there is nothing to be had under 5.15c. In New York Spelter is held at 5.25c. to 5.30c. Sellers seem disposed to hold off for higher prices.

Antimony.—The price of Antimony has again advanced, Hallett's being quoted at 11c. and Cookson's at 11c. to 11 1/2c.

Tin Plate.—Some rumors are heard regarding a slight concession in price, but leading manufacturers continue to quote \$4.09, f.o.b. New York, and \$3.90, f.o.b. Pittsburgh. The price of Tin Plates abroad declined 4 1/4d. during the week and they are now held in Swansea at 14s. 3d.

Ferroalloys.—The scarcity of spot Ferrosilicon continues, and a carload lot for prompt shipment would probably command \$105 to \$110. Future deliveries, however, are unchanged, at \$100. Ferromanganese is weak, shipments for

the last quarter being quoted at \$53 to \$54, duty paid, Baltimore. Prompt shipments can be had on a basis of \$56 to \$57.

Old Metals.—Conditions in the Old Metal trade are better, as supplies have not been coming forward at all freely, and there is no great surplus in the market. Should renewed buying set in of Ingot Copper it is not at all improbable that considerably better business will be done in Old Metals. Dealers' selling prices are easier, as follows:

	Cents.
Copper, Heavy and Crucible.....	14.00 to 14.50
Copper, Heavy and Wire.....	13.50 to 14.00
Copper, Light and Bottoms.....	12.50 to 13.00
Heavy Machine Composition.....	13.00 to 13.50
Brass, Heavy.....	10.00 to 10.25
Brass, Light.....	8.00 to 8.25
Clean Brass Turnings.....	8.50 to 9.00
Composition Turnings.....	11.00 to 11.50
Lead, Heavy.....	4.50
Lead, Tea.....	4.25
Zinc Scrap.....	4.00

New York.

NEW YORK, September 25, 1907.

Pig Iron.—There has been further good buying of Basic and of Pipe Irons, and a fair volume of business in Foundry Iron. For the present, the market seems to have found its level. It must be remembered that what restriction on the melt may have occurred, thus far, is probably offset by the lessened supply to the Eastern markets. There is no more foreign Iron, the Alabama and Virginia furnaces are entirely out of this market, and there is little coming in from the Buffalo District. We quote for large lots of Northern Irons, at tidewater, \$21.25 to \$21.75 for No. 1 Foundry, \$19.75 to \$20.25 for No. 2 Foundry and \$19 to \$19.50 for No. 2 Plain.

Steel Rails.—Scattering lots making a total of several thousand tons have been booked in the past week, but important contracts wait the conclusion of committee sessions. It is expected that recommendations of specifications will be made to railroad and Steel company presidents shortly and the way thus paved for buying. The general committee of railroad and Rail mill engineers is in session in New York to-day discussing the report of the subcommittee of eight. Trolley line business has dwindled under the money scarcity and little buying from that direction is expected for some time.

Structural Material.—While specifications hold up well and the mills are being pressed to make deliveries, particularly of wide Beams, on which they seem to be quite behind the demand, the amount of new construction coming up is lessening. For the work on which bids have gone in recently there has been sharp competition, the aggressiveness of some interests being quite pronounced. Lower costs are evidently being counted on by such bidders. The largest contract of the past week was 8000 tons of bridge work let by the Santa Fe. In general new railroad work in sight is much less than at this time last year, when plans for improvements to be made in 1907 were quite well forward. The New York Central contract for 2500 tons for a suburban station and a baggage subway at Depew place, Grand Central Station, this city, was taken by the McClintic-Marshall Construction Company. At Cleveland the Steel for a 2500-ton courthouse job that has been pending for some time went to the Cambria Steel Company. The total of September business taken by the fabricating companies is of fair proportions, but it indicates a slackening of the pace of the early part of the year. Financial questions are the deciding factor, and indications are that the situation is one that can only be gradually worked out. Among foreign inquiry is some Chilean railroad bridge work, about 2000 tons in all, on which bids are to be in by the end of the year, general international competition being sought. San Francisco work is slow coming out. A 1500-ton contract for the Phelan Building extension was taken in the week by the American Bridge Company. We quote on mill shipments the following tidewater delivery prices: Beams, Channels, Angles and Zees, 1.86c.; Tees, 1.91c. On Beams, 18 to 24 in., and Angles over 6 in., the extra is 0.10c. Sales out of stock, of material cut to length, are made at 2 1/4c. to 2 1/2c.

Bars.—The situation in Bar Iron is much less satisfactory, as the demand has diminished to small proportions. The inquiry is light, and neither dealers nor consumers appear disposed to do more than purchase for their most pressing requirements. The price is held at 1.60c., Pittsburgh, or 1.76c., tidewater, for such business as is at present being done. Steel Bars are in somewhat better demand than Bar Iron, with a recent sale reported of 2500 tons for concrete reinforcement. The War Department is making inquiry for 850 tons for reinforced concrete work in the Philippines. Manufacturers quote 1.60c., Pittsburgh, or 1.76c., tidewater, and are now able to make somewhat better deliveries than in the recent past.

Plates.—Orders are small, with little inquiry. Consumers in this locality are not pressed with work and are therefore buying sparingly. The Eastern mills, nevertheless, seem to be fairly supplied with orders from other sources and prices are firm, as follows, for tidewater de-

livery: Sheared Tank Plates, 1.86c. to 1.96c.; Flange Plates, 1.96c. to 2.06c.; Marine Plates, 2.26c. to 2.36c.; Fire Box Plates, 2.75c. to 3.50c., according to specifications.

Cast Iron Pipe.—The demand has diminished considerably, as the season is growing late and orders placed now would hardly be filled in sufficient time to enable the Pipe to be laid before cold weather. Buyers so far have shown no interest in contracting for delivery next year. Prices on carload lots of 6-in. are held at \$34 to \$34.50 per net ton, tidewater.

Old Material.—Prices are now down to a level which is rather attractive to consumers, and purchasers are distributed over the entire list. The demand is not sufficiently heavy to take up the entire supply of Scrap now coming out, and consequently some further recession in prices has taken place. While no disposition is shown as yet to make contracts for future delivery, the daily volume of sales by local dealers is more satisfactory than for some time. Quotations per gross ton, New York City, are as follows:

Old Girder and T-Rails for melting.....	\$14.00 to \$14.50
Heavy Melting Steel Scrap.....	13.50 to 14.00
Old Steel Rails, rerolling lengths.....	16.00 to 16.50
Rerolling Rails.....	26.00 to 26.50
Old Iron Rails.....	22.00 to 22.50
Standard Hammered Iron Car Axles.....	26.00 to 27.00
Old Steel Car Axles.....	19.00 to 19.50
No. 1 Railroad Wrought.....	16.50 to 17.00
Iron Track Scrap.....	14.50 to 15.00
No. 1 Yard Wrought, long.....	14.50 to 15.00
No. 1 Yard Wrought, short.....	14.00 to 14.50
Light Iron.....	9.00 to 9.50
Cast Borings.....	10.50 to 11.00
Wrought Turnings.....	11.50 to 12.00
Wrought Pipe.....	11.50 to 12.00
Old Car Wheels.....	22.00 to 22.50
No. 1 Heavy Cast, broken up.....	16.50 to 17.00
Stove Plate.....	14.00 to 14.50
Grate Bars.....	12.50 to 13.00
Malleable Cast.....	15.50 to 16.00

Iron and Industrial Stocks.

NEW YORK, September 25, 1907.

For the greater part of the past week the stock market has been under pressure. The weakness in prices has been mainly ascribed to the unfavorable copper situation, which has naturally suggested the possibility of a similar condition of affairs developing in the iron and steel trade. While the argument is made, and with great force, that the prices of iron and steel were not advanced during the recent great activity to the dizzy heights attained by copper, and therefore the cases are not parallel, nevertheless the public and especially the speculative element will endeavor to find a sympathetic movement in all metals. Under such conditions, therefore, it is not surprising that United States Steel common was forced down to 28 on Thursday of last week, and again down to the same price on Tuesday of this week, while the preferred, which touched 90 $\frac{3}{4}$ on Thursday, sold down to 90 $\frac{1}{2}$ on Tuesday. Other stocks showed the same tendency. The fluctuations on active stocks from Thursday to Tuesday were as follows: Steel common 28 to 29 $\frac{3}{4}$, preferred 90 $\frac{3}{4}$ to 92 $\frac{3}{4}$; Car & Foundry common 38 to 39 $\frac{1}{4}$, preferred 94 $\frac{1}{2}$ to 95; Locomotive common 52 to 53 $\frac{1}{2}$; Steel Foundries preferred 37 to 39; Colorado Fuel 22 $\frac{1}{2}$ to 24 $\frac{1}{2}$; Pressed Steel common 27 to 28 $\frac{1}{2}$, preferred 84 to 85; Railway Spring common 36 $\frac{1}{2}$ to 37, preferred 96 to 97 $\frac{1}{2}$; Republic common 21 $\frac{1}{4}$ to 22, preferred 74 to 74 $\frac{3}{4}$; Sloss-Sheffield common 47 to 48; Can preferred 47 $\frac{3}{4}$ to 49. Last transactions up to 1.30 p.m. to-day are reported at the following prices: United States Steel common 28, preferred 90 $\frac{3}{4}$; Car & Foundry common 38, preferred 95; Locomotive common 52 $\frac{1}{2}$, preferred 102; Steel Foundries 6 $\frac{3}{4}$, preferred 39 $\frac{1}{2}$; Colorado Fuel 22; Pressed Steel common 27, preferred 83; Railway Spring common 37; Republic common 21, preferred 74; Sloss-Sheffield common 47 $\frac{3}{4}$; Tennessee Coal 135; Cast Iron Pipe common 30, preferred 79; Can common 4 $\frac{1}{4}$, preferred 49. Allis-Chalmers' stock is showing more strength, the preferred having sold up to 25 to-day.

It is announced that the directors of the Lake Superior Corporation have decided to cut off further interest payments on the \$3,000,000 of 5 per cent. income bonds, which were issued under the plan of reorganization of the Consolidated Lake Superior Company. The reason for suspending payment of interest on these bonds is not the result of bad business, it is said, but because the money is needed in the business, for the conduct of which the company is borrowing money.

In explanation of the recent application of the Westinghouse Electric & Mfg. Company to list 20,000,000 francs (\$4,000,000) of 10-year 5 per cent. collateral notes on the Pittsburgh Stock Exchange, the statement is made that this note issue relates to the business of the Societe Electrique Westinghouse de Russie, or Russian Westinghouse Electric Company, which was organized for the purpose of executing contracts for more than \$5,000,000 with the municipal authorities of St. Petersburg, for the electrification of the tramways of the Russian capital and for the purchase of electrical works in Moscow for the manufacture of the machinery needed in the execution of the contracts referred to.

These new notes are to be offered by the Societe General for subscriptions in France and other European countries, but not in America, the listing of the securities in Pittsburgh being one of the formalities necessary in connection with the proper listing thereof on the Paris Bourse.

Dividends.—The Railway Steel Spring Company has declared a semiannual dividend of 2 per cent. on the common stock, payable October 22.

The New York Air Brake Company has declared a quarterly dividend of 2 per cent., payable October 22.

The Chicago Pneumatic Tool Company has declared the regular quarterly dividend of 1 per cent., payable October 25.

New Steel Rail Specifications.

The subcommittee of eight on steel rail specifications appointed by the General Conference Committee of railroads and steel works representatives held several sessions in New York City last week. The general committee, of which Geo. L. Peck of the Pennsylvania Lines West of Pittsburgh is chairman, met again on Tuesday of this week to receive the subcommittee's report, and is still in session at this writing. The subcommittee is composed of the following, representing the railroads: Joseph T. Richards, Pennsylvania Railroad, Philadelphia; J. D. Isaacs, Southern Pacific, Chicago; R. Montfort, Louisville & Nashville, Louisville, Ky.; P. H. Dudley, consulting engineer, New York. The steel works representatives are F. W. Wood, Maryland Steel Company; W. A. Bostwick, Carnegie Steel Company; P. E. Carhart, Illinois Steel Company, and F. E. Abbott, Lackawanna Steel Company.

It is expected that a heavier rail will be agreed upon, running up to at least 110 lb., with most of the additional metal in the flange and some addition to the thickness of the web. As to the discard, it is probable that an increase will be provided for. When the general committee agrees upon the new specification the various members will report it to the presidents of their respective companies, and a final conference will then be arranged between the presidents of railroads and of rail manufacturing companies.

The Gayley Dry Air Blast at South Chicago.—The Illinois Steel Company, one of the constituents of the United States Steel Corporation, has placed a contract to equip two blast furnaces at its South Works, Chicago, with the Gayley dry air blast. The new plant will be so located that it can be applied to any two of the furnaces of the groups No. 1, 2, 3 or 4, or to the Bessemer converters at the South Works. The contract for the refrigerating machinery has been placed with the Vilter Mfg. Company, Milwaukee, and includes four horizontal duplex ammonia compressors of 275 tons capacity each, 100 coils of double pipe ammonia condensers and 80 coils of double pipe brine coolers. It is believed that this will be the largest single refrigerating plant installed in this country. This dry blast contract will make the installation of the Gayley process available for six furnaces in this country and two in England, the installation of two furnaces at the Cardiff Works of Guest, Keen & Co., being expected to operate in October.

The Board of Directors of the LaBelle Iron Works, Steubenville, Ohio, met September 24, and organized, by electing the following officers: Isaac M. Scott, president; W. D. Crawford, vice-president and general manager; R. C. Kirk, treasurer; H. D. Westfall, secretary and manager of sales; W. B. Higgins, assistant secretary; J. H. Gilmore, assistant treasurer and auditor, the latter a new appointment. W. D. Crawford was elected a member of the board, succeeding A. S. List, of Wheeling, who resigned.

Commencing October 1, the American Sheet & Tin Plate Company, Pittsburgh, will have a sales manager of the Pittsburgh District, with headquarters on the fourteenth floor of the Frick Building, Pittsburgh. Mr. Bates has been appointed to fill this position.

The Machinery Trade.

NEW YORK, September 25, 1907.

Practically no improvement was manifested in the machinery trade the past week, business being rather quiet but showing an upward tendency. The demand, which was generally for small lots and single tools, came from scattered sources, and, though not large, its apparent steadiness indicated a stability to business that does not warrant the belief that there will be any further recession. It takes some little time for business to recover from a slump, and it is the opinion that if the present level is maintained for a few weeks trade will at the end of that time again reach a normal basis. Machinery men figure that the easing up of deliveries and the completion of the crop harvest, together with the improved conditions reported in the West, all tend toward a more active demand.

Machinery dealers in general seem to be able to make better terms with customers as regards deliveries, and a canvass of the situation made last week among New York houses shows that some classes of machine tools can be had on demand. These conditions are not taken by the dealers as being indicative of poor business, as they declare that under normal conditions they invariably can supply small orders from stock. Milling machines seem to be about the hardest class of machine tools to be gotten for early delivery, and a number of dealers require from four to five months for filling an order. The average delivery terms on large planers are four months, while the smaller classes of planers can be had in from four to eight weeks. Shapers, drill presses and some classes of power presses can be had from stock when required in small lots, and large orders can be filled in a fairly reasonable time, provided no special make is required.

The fact that the Harvey Engineering Company of Glasgow, Scotland, has been awarded a contract to furnish \$350,000 worth of machinery to equip a sugar factory at Arraya, Porto Rico, is of particular interest to machinery dealers here because of the fact that a representative of the Porto Rican people making the purchase spent several weeks in New York this summer in hopes of placing the business here, not only because he, as an engineer, favored American equipment, but because his principals had some connections in this country. The engineer left this country disappointed, after announcing that he would have to place the contract in Europe because of the fact that it would cost \$13 a ton to ship it from here to Porto Rico, as against \$6 a ton from Great Britain, notwithstanding the fact that the distance is really twice as far from the latter as from this country. Even taking into consideration that there would have been no tariff to pay if the contract had been awarded here, it was found that the excessive freight rates would make the American price much higher than the cost if purchased abroad. A prominent engineer who sells a large amount of sugar factory equipment stated last week that this problem has been one that the trade has had to contend with for a number of years past, as there are no American steamship lines in a position to compete with the British companies on a long journey freight contract. Some people in the trade even went so far as to look up the cost of chartering a steamer to freight the machinery in question from this country, but they found that they could not take the contract because it would cost too much in wages to ship a crew from this port. The engineer mentioned above stated that what is needed to improve trade between sugar plantation districts and the United States is cheap steamship freight facilities from American ports.

In this same connection it may be added that the trade from Cuba this summer has not been all that was expected, because of the fact that there was, generally speaking, a poor sugar crop on that island. There was some buying during the summer and a large part of the business placed came to dealers in this city, but it is declared that the sugar plantation and factory extensions were by no means what had been hoped for.

St. Louis & San Francisco Railroad's New Shops.

The St. Louis & San Francisco Railroad is arranging for the construction of large car and locomotive shops at Springfield, Mo., where a good part of the car building and repairs will be concentrated. The buildings, which are expected to be completed by March, will include a machine and erecting shop, 173 x 566 ft.; forge shop, 102 x 245 ft.; boiler and tank shop, 117 x 344 ft.; locomotive shop, 207 x 303 ft.; paint shop, 182 x 183 ft.; power house, 117 x 160 ft. The erecting shop will be equipped with a 100-ton and a 15-ton crane, and the machine shop with a 10-ton crane. In the boiler shop will be installed a 30-ton and a 10-ton crane, and six boilers with a combined capacity of 2400 hp. For trans-

ferring machinery, material and cars from building to building a 10-ton crane will be installed in the open, to have a 70-ft. span and to be operated on a 700-ft runway. Foundations for the buildings are nearing completion. The entire plant will be operated by electricity.

The following tools are included in the list which the purchasing agent of the Pennsylvania Railroad is sending out: One lathe for turning steel tired wheels, suitable for turning up to 42-in. wheels, and sufficient length between centers to take in an axle 7 ft. 4½ in. long, to be belt driven; one locomotive rod boring machine, one No. 10 vertical milling machine, one 75-ton hydraulic forcing press, one combined cold saw cutting off machine, diameter of saw, 32 in.; one automatic saw sharpening machine, and one self-feeding rip saw, table complete, with 24-in. saw.

The Baltimore & Ohio Railroad has been placing some orders in this territory within the last week, and this is taken by some to indicate that the company is beginning to close out its large list which has been before the trade for several weeks. Some orders were placed for cranes during the week, and it is stated that the specifications on which the crane bids were submitted were included in the large list of machine tools, so, notwithstanding the fact that machine tool men have not received any orders, it is thought that this preliminary buying marks the commencement of the purchasing on the big lists.

It is expected that the New York Central Railroad will soon come into the market for equipment for a number of car shop extensions it has in contemplation and under way. Those in the trade who are in touch with railroad affairs are looking for a list at almost any time. The company is preparing, it is said, to build a maintenance and repair shop at Fishkill Landing, N. Y. The shop will not be a very large one, but its equipment, together with other extensions which have been decided upon, will no doubt call for a good sized list of machine tools.

A complete manufacturing equipment is required by the Jones Mfg. Company, organized by Eli Jones of Lexington, Tenn., and others, for the manufacture of a Pittman connection for harvesting machinery which is patented. In addition the company will do general repair work and will carry for the trade mills supplies, belting, brass fittings, pipe, shafting, pulleys, &c. The company, which has a capital stock of \$15,000, has secured a building and is now in the market for one crude oil or kerosene engine of about 15 hp. capacity, drill presses, planers, steel stamping press, shaper, power hack saw, cranes, forges and foundry equipment. In addition to Mr. Jones, those interested are H. E. Graper, W. T. Watson, T. A. Lancaster, W. H. Lancaster, J. F. and J. C. Benson, A. M. Powers and F. O'Neal.

The Buffalo Foundry & Machine Company, Buffalo, N. Y., which was recently formed to take over the business of the Buffalo Foundry Company and the David Bell Engineering Works, will erect a new machine shop, 160 ft. long, the main bay to be 64 ft. wide, with 40 ft. clearance under the crane, and the side bay to be 30 ft. wide, with 15 ft. clearance under the crane. Provision has been made for the installation of a gallery on the side floor later. The company has not yet determined upon the machinery it will require for equipping the new building. The building will be erected adjoining the present foundry at East Ferry street, Fillmore avenue and the New York Central Belt Line, and will be used to a great extent for the manufacture of the David Bell steam hammers, vacuum dryers, impregnators, &c.

The Chafee Mfg. Company, New York, has been organized to manufacture hardware and household goods under the patent of J. Kleidmann. It is the intention to establish a plant in or near New York, for which it will purchase a complete machine shop equipment, including stamping presses and also an electro plating outfit. Martin Joachimson, consulting engineer, 14-16 Church street, is president; J. Kleidmann, vice-president; Max Warcheiser, treasurer; S. Herzog, secretary.

The York Paper & Felt Company, York, Pa., is to build a new plant, for the equipment of which it will purchase considerable machinery, including one paper machine, 16 beating engines, three refining engines, two stuff pumps, two water pumps, four stock cutters and electric motors for 1800 hp.

The Corn Products & Refining Mfg. Company, 26 Broadway, New York, is arranging to build at Summit, Ill., the largest glucose plant in the world, at a cost which is estimated in round figures at about \$5,000,000. The plant, for which preliminary plans have been prepared, will include about 30 buildings, and its equipment will necessitate the purchasing of a large amount of power equipment. A large amount of water is required in the process of manufacturing glucose and the company will have to buy some big pumping apparatus, &c., as fully 12,000,000 gal. of water a day will be used. The company has had the construction of the plant in sight for some time, but waited until assurance would be made that sufficient water was available at the site. It is understood that this plant will take the place of the company's large Chicago plant, which it is said will be dismantled when the new plant is completed.

The Celluloid Company, Newark, N. J., has been placing orders in this market of late which may be a prelude to some

large buying from that source in the near future. The company recently arranged for extending its power plant facilities, and it is said that arrangements are now under way for a large extension to the works, and an addition to the company's manufacturing facilities will necessitate the purchasing of considerable in the way of power presses and perhaps other machine tools.

Chicago Machinery Market.

CHICAGO, ILL., September 24, 1907.

Radical changes in the machinery market, either for better or for worse, are not looked for at this time, and the demand developing from week to week, though moderate, it is true, in comparison with records of the recent past is still of sufficient volume to furnish no ground for serious complaint. It is realized that the scarcity of money, reflected by abnormally high interest rates, and the conservative attitude of banks in making loans, naturally exert a restraining influence upon plant expansion plans. But this is regarded as a temporary condition, due more to an undefined feeling of caution and hesitancy than to unsound basic effects. In spite of the disquieting rumors that followed in the wake of the break of copper and other metals, there is a firm feeling among machinery dealers that the late fall and winter months will mark the beginning of gradual improvement. This hope is based upon the fact that beyond the uncertainty as to the final crop yield—a factor that is steadily lessening in importance with the continuance of favorable weather—there seems to be no good reason for a suspension of market interest. Outside of some moderate railroad requirements, heretofore reported, no large equipment orders are engaging the attention of machine tool dealers. The demand consists of scattered orders, individually small, but on the whole considerable in number. More new tools are seen on dealers' floors, indicating that manufacturers are making progress in overhauling their forward orders. Many shipments on old orders are being made direct from the factory to the user, and these help materially to swell the monthly sales totals. Cancellations of orders by tool users are comparatively infrequent, although default in promised deliveries frequently furnishes ample excuse for such action if buyers were disposed to take advantage of it. In no department of motive power machinery is the demand more active than in gas and gasoline engines, especially of small and medium horsepower. A buyer making recent inquiry in this market for such an engine of 40-hp., standard type, was informed by a prominent maker that delivery could not be promised inside of 60 days. This is of course not representative of the situation with all manufacturers, but since superlative excellence is not centered in any one make of engine, it may be taken to indicate a good general demand. Larger outfits in steam and other engines are moving more slowly.

The magnitude of Government work now under way for the reclamation of Western land by irrigation is perhaps not wholly appreciated by the public at large. There are doubtless many manufacturers who are not aware of the extensive purchases being made from time to time in behalf of this service. Work on about 30 different projects is either now in progress or in early contemplation, and the expenditures involved run far into the millions. There are now approximately \$46,000,000 in the fund available for operations connected with the reclamation service, and this is being expended for labor and supplies at an average of about \$1,000,000 a month. Of this vast sum a large portion is required for materials and machinery equipment of various sorts. Because of its central location and the diversified character of its products, the Chicago market is naturally looked to for a large share of these requirements. Edmund T. Perkins, M. Am. Soc. C. E., engineer in charge of transportation and purchasing for the United States Reclamation Service, has offices at 877 Federal Building, Chicago, and will supply any needed information respecting this department. Heavy purchases of electrical machinery for the equipment of large hydro-electric plants have recently been made through this office and more are in prospect. The establishment of repair shops at the site of dam, tunnel and power plant construction work necessitates the purchases of machine tools and other machinery from time to time. Except on emergency orders competitive bids are taken on all supplies.

Plans for an important addition to the plant of the Adams & Westlake Company, Chicago, maker of car finishing fixtures and supplies and metal bedsteads, have been completed, and arrangements are now being made for the construction of the building. The site occupied by the company includes an entire city block bounded by Franklin and

Orleans streets on the east and west, and by Ontario and Ohio streets on the north and south. This space is already fully covered by buildings of the present plant, two of which, fronting on Ohio street, are being torn down to make way for the new building. The contemplated structure will be 100 x 100 ft., seven stories high, of combination steel and mill construction. A notable feature embodied in the plans for this improvement is a very commodious and modernly equipped brass foundry room, which will occupy the entire top floor. By the use of steel curtains dividing the molding from the pouring room, and an ingenious system of ventilation incorporated in the design, the highest degree of comfort and convenience is expected to be attained. A saw tooth roof will furnish ample light, and a heavy concrete floor will provide security against damage from fire. A considerable amount of new machinery will be required for the equipment of this building, both in foundry appliances and machine tools. The date for beginning active construction work on the building has not yet been fixed, but present plans contemplate its completion without undue delay.

The Foote Brothers Gear & Machine Company, 24 South Clinton street, Chicago, maker of gear cutting and special machinery, on account of being within the boundaries of the territory to be occupied by the new terminal station of the Chicago & Northwestern Railroad, is compelled to seek new quarters. Upon a site recently acquired at 46-52 North Carpenter street, the company will erect a factory building, 92 x 121 ft., three stories high. Some machinery equipment for the new building, which will be modern in every respect, has been purchased, but the company will be in the market for additional lathes, gear cutters and possibly a key seating machine. The officers are J. B. Foote, president and treasurer; B. Foote, vice-president, and L. Larson, secretary.

The Marinette Iron Mfg. Company, Marinette, Wis., has designed and is making patterns for a new lathe, which it is believed will prove a valuable addition to the line of machinery equipment it now manufactures. As an indication of the demand for motive power machinery, the company states that it has under way the manufacture of 250 gasoline engines ranging in size from 1 to 20 hp.

The Davenport Wagon Company, Davenport, Iowa, manufacturer of steel wheel and steel gear farm wagons, has purchased the property now occupied by the People's Light Company's electric and heating plant on Third street, between Le Claire and Farnam streets, and will in the spring begin the erection on this site of a large factory for the manufacture of its product. At the present time, and for several years, the company has occupied quarters inadequate in capacity, and the present move is the result of an increasing demand for all steel wagons. The new plant will require a large amount of new machinery adapted to pressed steel and other work involved in steel wagon construction. The plant when completed will be thoroughly representative of modern practice, both in the character and arrangement of its buildings and in the selection of its machinery equipment.

The Illinois Steel Company has placed a contract with the Rust Boiler Company, Philadelphia, Pa., for the installation of three 300-hp. units of Rust water tube boilers in its new by-product coke plant at Joliet, Ill. Similar boilers, which are of vertical type, have been used successfully for some years in the South Chicago mills.

The Northern Texas Traction Company, H. T. Edgar, general manager, Fort Worth, Texas, contemplates improvements to its power house, which will double its present capacity and involve the expenditure of about \$150,000.

The Greenville Light & Water Company, Luzerne, Ky., has been organized with a capital stock of \$35,000, to build and operate an electric light and pumping plant. None of the material for this installation has yet been purchased, and the company is now in the market for electric machinery and pumping apparatus.

The Allis-Chalmers Company, Milwaukee, has recently been awarded a contract by the Louisville, Ky., water works for a 24,000,000-gal. triple expansion pumping engine of the latest design.

The Chickasha Water Power Company, Chickasha, I. T., is preparing to begin the construction of an electric light and power plant, for the equipment of which it is now in the market for one 500-hp. horizontal water wheel, which it will duplicate in a short time, one belt driven 350-kw., 4440-volt, 60-cycle, 3-phase generator, poles, wire, &c. The company has started to construct the dam, and will purchase the machinery shortly in order to have it installed by the time the dam is built. Lawrence Martin, treasurer, has the matter in charge.

A press dispatch from Birmingham, Ala., says that, according to statements given out by the mining engineers of the Alabama Consolidated Coal & Iron Company, a 70-ft. vein of iron ore has been discovered in Shades Valley, on the property of that company, which will add enormously to the known supply of ore in the Birmingham District.

Cleveland Machinery Market.

CLEVELAND, OHIO, September 24, 1907.

The local machinery market showed a little improvement during the past week in the number of inquiries, but the volume of business placed was probably not larger than earlier in the month. A more optimistic feeling prevails, however, than there did a few weeks ago, and machine tool dealers are looking for a gradual improvement in the market with the beginning of October. The demand at present is almost entirely for one or two tools for additional shop equipment or to replace old tools, and all purchasers want quick deliveries. Although the deliveries of most machine tools show considerable improvement and dealers have larger stocks on hand than they have had for several months, they say that orders would be much more numerous at present if they could make reasonably prompt deliveries. Manufacturers, as a rule, are now looking for very satisfactory business conditions during the next few months, and some of them who have been holding back are more disposed to go ahead with projected enlargement of their plants, which will increase the demand for machine tools. Two good sized inquiries have come into the market during the week from industrial plants that have extensions in view. New industrial projects requiring machinery equipment are still very scarce, although there are some that were launched during the past few months that, as yet, have not gone beyond the incorporation stage. The few new enterprises that are being started up is attributable entirely to the stringency of the money market.

Manufacturing plants continue busy, and the majority of them are catching up on deliveries. While some report that business is keeping up in very good shape, the new orders received by others are light. While the automobile builders are doing no extensive buying, some of them are making purchases of a few machine tools. More second-hand tools are offered than a few months ago, but dealers are having no trouble in quickly disposing of all old tools that they pick up in good condition.

The recently incorporated Cleveland Chain & Mfg. Company has commenced the erection of a new plant on a site purchased along the Pennsylvania Railroad tracks, near Garfield Park. The main building will be 75 x 300 ft., one-story high, and in addition there will be a boiler and engine room. Contracts have been closed for a 150-hp. engine and boiler and for forges and special chain making machinery. The company will manufacture hand and machine made chain, and will make a specialty of conveyor chain. It is expected that the plant will be ready for operation November 15.

The Anchor Fence & Mfg. Company, now located on River street, has secured a new site in Newburgh, and will at once erect a new plant to accommodate its increasing business. The new plant will be 80 x 200 ft., one-story high. The company will purchase considerable new equipment for it. To provide for the new plant the capital stock was recently increased from \$10,000 to \$60,000.

William Clerkin, who recently disposed of his interest in the XXth Century Heating & Ventilating Company, Akron, Ohio, has bought the plant of Taplin, Rice & Co., builders of furnaces, in Akron, and will soon form a company for its operation on an enlarged scale. Mr. Clerkin has also secured 10 acres of land for the erection of a large new plant. A company with a capitalization of \$250,000 will be formed, of which Mr. Clerkin will hold the controlling interest. Some prominent business men of Akron and a number of Eastern capitalists will be associated with Mr. Clerkin in the enterprise. Supply depots will be established within the next few weeks at Chicago, Minneapolis, Kansas City, Denver, Louisville, Chattanooga, Pittsburgh, Rochester and Cleveland. The company will manufacture all kinds of furnaces, steam and hot water boilers, furnace and boiler fittings and trimmings, and a line of stoves and ranges.

The Burt Mfg. Company, Akron, Ohio, which recently increased its capital stock from \$50,000 to \$150,000, announces that the increased capital is to take care of its increased ventilator business. No additions to the plant are contemplated.

The Kreig Gas Burner Company has been organized in Newark, Ohio, for the manufacture of a gas burner designed for use especially in power plants. The company is now looking for a suitable site for the erection of a plant in Newark. The officers are James E. Jones, president; Channing Thompson, secretary and treasurer, and James Mills, manager.

After successful trials of the Deming mowing machine, steps are being taken to secure stock subscriptions to build in Barberton, Ohio, a plant for the manufacture of the mower. The officers of the reorganized Deming Company are Charles Johnson, president; Charles J. Alpeter, vice-president; H. A. Snyder, secretary and treasurer, and Henry Deming, manager.

The Cleveland Steel Casting Company has commenced the erection of an addition to its plant on East Sixty-ninth street.

The plant of the Ohio Cultivator Company, Bellevue, Ohio, will be enlarged by the erection of a two-story brick building, 75 x 150 ft.

The Board of Public Affairs, Ashland, Ohio, has awarded a contract to the Canton-Hughes Pump Company, Canton, Ohio, for a 2,000,000-gal. pump for the municipal water works, and to D. Connelly & Co., Cleveland, for two boilers.

The Bruce-Meriam-Abbott Company, Cleveland, manufacturer of gas engines, has increased its capital stock from \$100,000 to \$300,000. The company will enlarge its output of gas engines and may soon build a new plant.

Cincinnati Machinery Market.

CINCINNATI, OHIO, September 24, 1907.

While the local situation as to machine tools cannot by any means be said to be in an apathetic condition, there is still a lack of that inquiry which might be expected at this period of the year. On the other hand, the big tool builders view the situation with little or no concern, for they are still employing every productive factor available in order to catch up on deliveries, or at least reduce the pressure. The car shortage seems not to have affected adversely the local tool building interests through the foundries upon which they depend for castings, for these are being furnished promptly, such as are made in the city, and the furnaces in the Birmingham District are rushing contract iron in at a great rate. There have been no cancellations of plans outlined for improvements, such as additions to tool building and machinery companies, and work on the many such is progressing favorably, in a number of instances expensive additions not contemplated in the original plans being added within the past six weeks.

So far as interviewed the past week, manufacturers' expressions on the present and outlook were of a decidedly optimistic nature. The opinion seemed unanimous that the East is entitled to the greatest meed of praise for latter day performance in buying and inquiries, some tool builders reporting the best business for years from that section. This is particularly true of the drill manufacturers. There is reported some uneasiness on the part of the manufacturers up in the State over the freight rate on pig iron, and the Receivers' and Shippers' Association of Cincinnati has been asked to co-operate with similar associations in such cities as Columbus, Dayton, Springfield, Middletown and others in an effort to have the tariff reduced. William Fetzner of the William Fetzner Company, Middletown, is conspicuous in the movement, as is also Commissioner W. B. Moore of the Dayton Receivers' and Shippers' Association. A meeting of manufacturers who depend largely on the product of the Southern furnaces will be called in a few days by Commissioner Moore to consider ways and means. Commissioner Williamson of the Cincinnati Receivers' and Shippers' Association is cognizant of the movement and will co-operate with the other officials.

Sales agents report an increased inquiry, particularly on medium priced tools, and there is some movement in second-hand machinery.

The demand for boilers of the tubular type is excellent, the prevailing fine crop conditions in the South and great activity among the builders making new boilers and engines in the sawmills, cotton ginning plants, &c., an early necessity. A large local concern manufacturing throttling engines and boilers has added a department for the manufacture of horizontal tubular boilers, stationary and portable, and is working the new department to its best capacity on orders.

But one cancellation was encountered in visiting manufacturers the past week. This one came from the Pacific Coast and asked for a delay in shipment of four lathes which were designed for stock. The order was immediately placed for shipment to a Boston party that had been particularly pressing.

The matter of a small percentage allowance for advertising is familiar to local tool builders who have been approached by dealers for this concession, but there is a disposition to evade it at this time, not only because of the heavy advance bookings in most shops which is conducive to a spirit of independence, but because of added cost of production through various causes known to the trade in general.

An order from Barcelona, Spain, for tools recalls to the minds of prominent tool builders an experience with a sales agent in that metropolis, whose flaming and patriotic letter head and splendid references a few years ago secured shipments of several thousand dollars' worth of machinery which were never paid for. The newer methods of dealing with foreign countries have greatly relieved this situation and made practically impossible a similar experience.

The Factory Power Company, which is the new organization designed to furnish power for the Oakley colony of machinery manufacturers, and is headed by Fred C. Geier of the Cincinnati Milling Machine Company, is rapidly getting the new plant in shape. The institutions which will be supplied with power from this plant in a specially arranged underground connection will be the Cincinnati Milling Machine Company, Peck-Williamson Heating & Ventilating Company, Model Foundry Company and later the Cincinnati Planer Company and the Bickford Drill & Tool Company.

The Carey Mfg. Company, Lockland, is to have a new building for the manufacture of asbestos pipe covering, and plans have been prepared by Architects Rapp, Zettler & Rapp for a three-story structure, 100 x 400 ft. The company will erect also a new paper mill about 100 x 300 ft., plans for which have been prepared by George Hardy of New York.

Vice-President and Treasurer Philip Fosdick of the Kern Machine Tool Company is expected in Cincinnati from his European trip October 17 or 18. He will spend a few days in New York on landing. The new addition to the company's plant of 60 x 120 ft. is expected to be completed in six or seven weeks.

The Houston, Stanwood & Gamble Company, builder of throttling engines and boilers, Covington, Ky., has just closed its fiscal year with the best record of its career. The books showed a business of over \$500,000 for the year, which was 33 1-3 per cent. better than any former one. The company's new boiler shop is one of the most complete in this section and is just now the busiest place in the big plant. The new department for the manufacture of horizontal tubular boilers, both stationary and portable, has proved immensely successful.

The Cincinnati Horse Shoe & Iron Company, manufacturer of horse and mule shoes, is one of the newest claimants to public approval for vigorous business campaigning. It was organized in February, 1906, and did business for a time under the name of the Graham & Phillips Company. The reorganization as the Cincinnati Horse Shoe & Iron Company occurred in May, 1907. The territory, which was at first comparatively insignificant, is constantly being enlarged, and now the new product is known and pushed in almost every part of the country, the new catalogue showing illustrations of 80 different kinds of shoes. The output for September will show an increase of 150 per cent. over that of July. The mill is located at Cleves, Ohio, 16 miles from Cincinnati.

The first fire of the new Ohio Steel Castings Company, at Lima, Ohio, was started September 16. The new company has a capitalization of \$400,000 and starts with 120 men on the payrolls. The number will be increased gradually until by the first of the year it is expected that 500 mechanics will be utilized, since practically the entire output is taken through contracts with the Lima Locomotive & Machine Company, builder of the Shay patent locomotive. The new buildings have been under construction the past eight months and are strictly modern.

It is reported that Bernard H. Linneman & Co., proprietors of the Sterling Seat Company, have acquired an interest in the business of the Cincinnati Panel Company, West Eighth street, Cincinnati, and that eventually the concerns will be merged.

Julius Reiser, trustee of the Bracket Bridge Company, bankrupt, has been granted permission to sell the plant and stock as a going concern. The appraisement is \$40,000 and a pile of scrap iron at \$7000. The sale will be conducted by United States Bankruptcy Referee Whittaker and will be private.

J. C. Lemon of the Builders' and Traders' Exchange has been commissioned by the Eagle White Lead Company to prepare plans for the rebuilding of its buckle and corroding houses, destroyed in the recent fire that visited that neighborhood. The buckle house will be of brick and concrete, 25 x 50 ft. There will be 30 new corroding houses, each 25 x 50 ft. and 20 ft. in height.

The Champion Iron Company, Kenton, Ohio, has increased its capital stock from \$150,000 to \$500,000.

Capitalists of Williamsport, W. Va., will establish a foundry plant at Bylesville, Ohio, for the manufacture of mine car wheels, soil pipe, soil pipe fittings and other foundry products. The Bylesville Improvement Association conveys to Willis Morris and associates a number of lots and a \$21,000 bond. Construction is to begin on or before October 1, and the entire plant is to be completed and running full force by not later than January 1, 1908, with a payroll of \$5000 to \$10,000 per month. The main foundry building is to be 110 x 200 ft., cleaning and dipping building, 30 x 80 ft.; machine shop, 40 x 100 ft. The foundry is to be equipped with a cupola of 20 to 30 tons daily capacity. The cost of the building is to be not less than \$35,000. It is expected that the new company will also purchase the plant of the Bylesville Glass Company and put it into operation. The new corporation will be known as the Bylesville Foundry & Machine Company, will be capitalized at \$75,000, and the incorporators are Willis Morris, J. W. Fenton, Robert T. Scott, S. W. Nicholson and W. H. Davis.

The Foote Mfg. Company, Fredericktown, Ohio, will re-

move to Dayton October 1, will occupy the second floor of the Hartman-Franz Building at 114 North St. Clair street and will manufacture mail order specialties.

The Yieldable Gear Company, Springfield, Ohio, has been incorporated at \$10,000 by Charles E. Wade, secretary and treasurer of the Owen Machine Tool Company, and associates.

It is reported that Chas. Seybold, president of the Seybold Foundry in Edgemont, Ohio, near Dayton, has established a molders' school in which to educate men to take the place of strikers in his plant.

The Board of Public Service, Cincinnati, has awarded contracts for water meters and connections to the American Valve & Meter Company, Cincinnati; Neptune Meter Company, New York; Pittsburgh Meter Company, Pittsburgh; Thompson Meter Company, Brooklyn, N. Y., and Buffalo Meter Company, Buffalo, N. Y.

Arthur C. Pletz, Mercantile Library Building, has added to the list of companies for which he is acting as sales agent the Pittsburgh Automatic Vise Company, the Simplex Mfg. Company, maker of hack saw machines. He reports a good inquiry on small parts and attachments.

W. C. Walker, representing the Chicago Pneumatic Tool Company, with headquarters in the Grand Hotel Building, has returned from a prosperous two weeks' trip in the South.

Robert G. Brown, the new instructor in mechanical engineering at the University of Cincinnati, has created a most excellent impression with both students and faculty. He is a man of varied experience and attainments. He began as a newspaper reporter, next was a shipbuilding engineer, then a designer of piping systems, and for the past few years was an instructor in Purdue University.

An interesting exhibit at the plant of the Findlay (Ohio) Foundry & Machine Company is a small cold metal saw of new design, an invention of one of the members of the concern. It is of the circular saw type.

An interesting visitor at the tool making plants in this section the past week was Saran Dass Jalata, a young East Indian, one of the first five natives to graduate as electrical engineers in this country. He graduated from the University of Michigan and is on his way to India to take up the work of his profession.

Jacob R. Bixby of Winnipeg, Canada, was another visitor of the week, who made visits to several of the larger plants and it is said placed some good sized orders. He remarked that Winnipeg is the distributing point for all agricultural and other machinery sold throughout the provinces of Manitoba, Assiniboia and North and South Alberta.

Philadelphia Machinery Market.

PHILADELPHIA, PA., September 23, 1907.

There has been but little change in the general conditions governing the local machinery market, and sales during the past week show but little improvement over the previous one. Buyers still cling to their determination not to come in the market at the present time; viewing the situation in the light that it is unwise under existing conditions to place orders for any extensive equipment on which deliveries could not be made until some time next year, for the reason that it is impossible to determine what general business conditions will be that far ahead. At the same time buyers of smaller equipment, single tools, &c., are inclined to withhold orders largely on the question of price, contending, they argue, that if deliveries can now be had fairly promptly there will not be much difficulty in obtaining at least as good and probably better deliveries a month or so hence, and that in the meantime, they think, some concessions in the way of prices might be obtained. New business therefore does not develop to any great extent, both manufacturers and merchants noting the absence of specifications for any considerable amount. Sales have been confined largely to single tools. One lot, consisting of three planers, a shaper and a cold saw cutting off machine was, as far as can be learned, about the best sale of the week. Several sales of lathes, radial drills and special boring machines have been made, but most of the tools have been those of the smaller sizes. There has been no further development in railroad business, and both specifications and orders from buyers of this class have been light.

While manufacturing plants keep busy, it is largely on business already in hand. Some concerns are building tools for stock along with orders on the books, so that plants can be kept fully occupied, and to avoid, if possible, the breaking up of organized working forces. What this will mean in the future, unless new business develops pretty strongly, is self-evident. Here and there one can note the partial reduction of working forces, but, as a rule, there is enough business still on hand to keep full forces working.

On the whole, the situation does not look as encourag-

ing for the early resumption of active business as it did some weeks ago. Quite a few in the trade are of the opinion that conditions will continue rather inactive, with a fair amount of day-to-day business coming out until after the turn of the year, when they expect more activity. No anxiety, however, is expressed as to the ultimate return of good business, as both manufacturers and merchants have had a long period of tremendous activity, and some little let-up, so as to get back to more normal conditions, will not be altogether unwelcome.

There is not much change in the foreign trade. While there is some comment on the probable large purchases of tools and equipment by Russia, Japan and some other countries, doubt is expressed as to much of this business coming this way. The cost of raw materials and the high wage rate paid both skilled and unskilled labor make it difficult to meet the price of tools against foreign competition. Some little new business from abroad has been taken recently by the local trade, but it has been confined almost exclusively to special tools and appliances.

The demand for boilers and engines does not develop as rapidly as the trade would like. New business comes out slowly, and propositions under consideration are hard to get closed. This condition is evident in both the new and second-hand field. Second-hand machinery has been in somewhat better demand, particularly tools of the larger sizes. Small tools are dull and inactive.

The foundry trade continues on a fairly even basis. The volume of business is considerably less than it was some months ago, and foundrymen as a rule are making more strenuous efforts to get orders. In some instances concessions are being made, but with prices of raw material falling off there is a tendency on the part of consumers to withhold business until they find prices indicating bottom. Steel casting plants find it rather difficult to close contracts for any great length of time ahead, and it is understood that but little business for next year's delivery has been secured.

Walter J. Wagner, who for some time has been connected with the local branch office of Manning, Maxwell & Moore, has resigned, to take effect October 1, having accepted the position of purchasing agent with the Robins Conveying Belt Company, Passaic, N. J.

Several of the local shipyards received contracts from the Government during the past week, which will further insure active conditions in that line. The Cramp Ship & Engine Building Company was awarded the contract for two torpedo boat destroyers, equipped with turbine engines, at a cost of \$575,000 each, while the New York Shipbuilding Company, Camden, N. J., was awarded a contract for one destroyer at \$645,000. These boats are subject to early delivery and will keep the various yards particularly busy for some little time.

Contracts were recently let by the Director of Public Works, Philadelphia, for a number of new bridges, mention of which was recently made in these columns. These include a new structure at Belmont and Girard avenues, and another at Columbia avenue, over the Pennsylvania Railroad tracks, and another over the Newton branch of the Reading. A contract was also let by the same department for furnishing 2354 tons of 48-in. cast iron water pipe for the continuation of the filtered water supply. The latter was awarded the Millard Construction Company, and it is understood that the pipe will be furnished by the Warren Foundry & Machine Company.

Ferguson & McDowell, contractors, have been granted the contract to build a one-story brick garage for Stockwell & Brown, at 4525-27 Springfield avenue. The new building will measure 44 x 100 ft.

P. H. & A. S. Morris, engineers and machinists, whose plant at Front and Dickinson streets, was destroyed by fire some months ago, have purchased the machine shop, plant and equipment of the Philadelphia Rubber Works, Schuylkill avenue and Reed street. The property measures 110 x 345 ft., and has good railroad facilities, the Baltimore & Ohio Railroad siding extending into the yard. The present machine shop measures 60 x 100 ft., but plans are being made for a 100-ft. extension. A large number of tools were taken over with the plant, to which have been added those which escaped damage in the recent fire, so that the plant is now well equipped for all classes of work. On the completion of the proposed addition this firm will be in the market for quite a few machine tools.

The Espen-Lucas Machine Works keeps fully occupied. New propositions develop rather slowly, and are confined particularly to special tools. There is a fair amount of inquiry for new business, but orders are reported slow in developing. Cold saw cutting off machines, floor boring and drilling and milling machines seem to be in the best demand, and orders for several tools have recently been booked. Some good shipments of heavy special machinery and large cold saw cutting off machines have been recently made.

I. H. Johnson, Jr., & Co., Inc., continue busy in all departments. New work is not coming in as freely as some time ago, although some nice orders for lathes of both the larger and medium sizes, ranging from 20 to 36 in., have recently been booked, and sufficient orders are on hand

to keep the plant busy for some time to come. Deliveries have not been very heavy of late, a condition which is more or less frequent at times in this line of manufacture, although the work now coming through will make shipments in the near future very large.

The Mummert, Wolf & Dixon Company, Hanover, Pa., reports some very satisfactory sales of its new Plurality die bolt cutting machine, which is being placed on the market in three sizes. One machine has been furnished a customer in Hagerstown, Md., another to York, Pa., parties, while a third machine has been shipped to the Middle West. A good business is also reported in grinding machinery, and the outlook is considered very satisfactory.

New England Machinery Market.

WORCESTER, MASS., September 24, 1907.

A general improvement has been noted in the machine tool trade during the week, and the change extends into other lines of machinery entering into manufacturing equipment. The increase of business is not great, yet it is sufficient to give confidence that a turn for the better has begun, fulfilling the expectation of the summer. The machine tool builders have felt the altered tone of the market, as well as the dealers. Boston branches of houses located in other cities have received encouraging reports from the home offices. The result is an added buoyancy, which should have its effect upon buyers. It is well understood that users of machinery are frequently influenced by the condition of the machinery market itself in their decisions as to buying, and an expression of confidence on the part of the dealers, or the indications of depression, achieve their opposite results in the way of volume of business.

Orders received during the week are of small size, with occasional rather rare exceptions, but the total is quite good. Increasing inquiries from customers look to a still greater increase in business, especially as some of them are for considerable lots of tools.

Representatives of New England machine tool houses who have returned from Western trips report that conditions seemed to grow better the farther west they went. They heard some expressions of belief that a genuine boom is to be expected, but the more common view was that a marked improvement upon a business already quite satisfactory is rapidly approaching.

Collections are bothering some manufacturers and dealers, due to the state of the money market, it is generally conceded. There is a tendency to offer discounts for cash on the part of some houses that have previously declined to avail themselves of this common practice. It is expected that with an easier money market there will be a correspondingly greater inclination and ability to meet payments promptly.

The foundry business in New England has met with something of a slump, and the foundrymen are at a loss to account for the change. Orders have fallen off quite materially, but customers are running their works as full as ever. Manufacturers of all lines of machinery and other products requiring castings are busy with orders booked months ago, together with those of more recent date. Many of them have no great stock of castings ahead. Yet the books of the foundries denote a sharp decline in new business. It is expected, however, that customers who have been holding off from buying will soon have to renew their supply of castings. Many machine tool builders are not curtailing in their stock orders for castings, for their deliveries are still in arrears. A constant, though diminished, volume of new business is being booked, and the general feeling is that there will be a marked increase of orders from now on.

Builders of mining machinery have felt little change in the volume of their business. The Sturtevant Mill Company, Boston, which manufactures and markets a large line of mining machinery, reports that the new orders booked in the past three months exceeded the business of the corresponding months of 1906 by 15 per cent., and that the 12 months preceding, constituting the company's fiscal year, was 50 per cent. better than the year before. In addition to recent orders more than 200 inquiries have been received in the last three weeks pointing to new business. The export business continues strong, especially for Norway and Sweden, South Africa, South America and Mexico. Japanese business has shown a shrinkage.

The Barnett Drop Forging Company, Easthampton, Mass., has enlarged and improved its plant since the recent fire, and is now installing a 4000-lb. hammer for automobile and other heavy work. The equipment for special forging is already complete.

The Manhattan Market Company, Cambridge, Mass., is in the market for a 100-hp. gas producer plant. The matter is in charge of H. S. Potter, Jr., treasurer.

There is a good deal of interest in the statement of President Mellen of the New York, New Haven & Hartford

Railroad that his company will make no attempt to take over the Boston & Maine system while public opinion and Boston & Maine stockholders continue in opposition, as has developed since the original announcement of the plan some months ago. It was believed that the Consolidated's control of the Boston & Maine, with its large mileage of track, would mean its re-equipment on a large scale; in fact, the formal announcement was made that such would be the case. It is generally believed that the whole matter will be left up in the air in such a way that nothing will be done toward the building of the great repair shops planned for the Boston & Maine at Somerville, a project that has been watched by the trade for many months.

The Massachusetts Railroad Commission has decided in favor of what is known as the Gaston-Shaw-Stone & Webster syndicate in the matter of a new electric railroad connecting Boston and Providence, which shall combine the road bed of a steam railroad with electric traction. Three other enterprises of a similar nature were in the field for the necessary franchise, under recently enacted legislation, by which the commission may grant certificate of public necessity or convenience, providing for a class of rail transportation having electricity as a motive power, with the advantages of a street railroad in and near centers of population and with the speed and independence of a steam railroad in traversing country districts lying between urban communities. It is understood that the new road will be elaborately equipped for a highly efficient interurban system.

B. F. Perkins & Son, Holyoke, Mass., manufacturers of ventilating and exhaust fans, foundry snap flasks, power testing machines and paper and textile machinery, are to erect a new brick manufacturing building 123 x 136 ft., and three stories, as an addition to their calendar roll department.

The Vulcan Iron Works, New Britain, Conn., manufacturer of malleable iron castings, is to enlarge its plant by the building of an addition to its foundry 58 x 80 ft., cupola building 35 x 45 ft. and a toilet room 26 x 30 ft., all of brick and steel construction.

The Coe Brass Mfg. Company, Torrington, Conn., states that there is no truth in the published report that it is contemplating putting a second story on the new machine and blacksmith shop which is now in process of erection.

The Reed & Prince Mfg. Company, Worcester, Mass., manufacturer of screws, is to erect a five-story storage building, about 80 x 224 ft., of mill construction. The occupancy of the structure will release considerable space in the present buildings for manufacturing purposes, which will be gradually filled up as the need shall require.

Government Purchases.

WASHINGTON, D. C., September 24, 1907.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until October 1 for the following machinery for the various navy yards: New York, schedule 291, engine lathes, boring mill, boring and drilling machines, universal shaper; Indian Head, Md., traveling crane and hoist; Norfolk, Va., schedule 290, nut facing machine.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until October 15 for a power press and other supplies for the Mare Island Navy Yard.

The Bureau of Yards and Docks, Navy Department, Washington, will receive bids until November 9 for a power plant for the United States Naval Hospital, New Fort Lyon, Colo.

The Isthmian Canal Commission will receive bids until October 14, circular No. 392, for four hoisting engines, one tool room engine lathe, one hand planer and jointer, one swing cutoff saw, &c.

Bids will be received until October 1 at Jefferson Barracks, Mo., for two boilers.

The Isthmian Canal Commission will soon purchase four double acting force pumps and two duplex high duty water pumps.

The following bids for supplies for the navy yards were opened September 17:

Bidder 84, Excelsior Equipment Company, Pittsburgh, Pa.; 102, Frevert Machinery Company, New York; 114, Gardiner Governor Company, Quincy, Ill.; 118, G. & W. Mfg. Company, New York; 200, Manning, Maxwell & Moore, New York; 222, Oliver Machinery Company, New York; 233, J. W. Paxson Company, Philadelphia, Pa.; 321, Westinghouse Air Brake Company, Pittsburgh, Pa.; 330, Williamson Bros. Company, Philadelphia, Pa.; 337, American Wood-working Machinery Company, Rochester, N. Y.

Class 254. One double engine—Bidder 118, \$1240; 330, \$900.

Class 271. One core making machine—Bidder 84, \$62.50; 233, \$85.

Class 274. One metal band saw machine—Bidder 102, \$104 and \$108; 200, \$105; 222, \$200.

Class 276. One pattern maker's speed lathe—Bidder 222, \$212.

Class 277. One air compressor—Bidder 114, \$750; 321, \$176.50.

Class 278. One sand papering machine—Bidder 337, \$125.

The following bids were received September 14 for furnishing 15 motor generator sets and accessories for the navy yard, New York:

Item 1, price of installation of entire equipment; 2, price in accordance with bidder's specifications.

Westinghouse Electric & Mfg. Company, Baltimore, Md., item 1, \$62,995.

Western Electric Company, New York, item 1, \$84,480.

General Electric Company, Schenectady, N. Y., item 1, \$61,510; 2, \$52,560.

The following bids were opened September 18, circular No. 387, for supplies for the Isthmian Canal Commission:

Bidder 2, Chester B. Albee Iron Works Company, Allegheny, Pa.; 7, Central Metal & Supply Company, Baltimore, Md.; 8, Chicago Pneumatic Tool Company, New York; 9, Cleveland Pneumatic Tool Company, Cleveland, Ohio; 10, Columbus Pneumatic Tool Company, Columbus, Ohio; 12, Dayton Pneumatic Tool Company, Dayton, Ohio; 16, Excelsior Equipment Company, Pittsburgh, Pa.; 18, Fox Bros. & Co., New York; 25, Hisey-Wolf Machine Company, Cincinnati, Ohio; 29, Independent Pneumatic Tool Company, Chicago, Ill.; 30, Ingersoll-Rand Company, New York; 34, Manning, Maxwell & Moore, New York; 36, Motley, Green & Co., New York; 37, National Electrical Supply Company, Washington, D. C.; 41, Niles-Bement-Pond Company, New York; 44, Pilling Air Engine Company, Detroit, Mich.; 45, Pneumatic Appliance Company, New York; 50, Wm. Sellers & Co., Philadelphia, Pa.; 54, Standard Railway & Equipment Company, New York; 59, Vermilye & Power, New York; 60, Westinghouse Electric & Mfg. Company, Baltimore, Md.; 62, F. T. Witte Hardware Company, New York; 69, H. E. Boucher Mfg. Company, New York.

Class 1. Steam riveting machine—Bidder 2, \$2265 and \$2392, 90 days; 16, \$2285, 60 days; 34, \$1830.98 and \$2059.75, 116 days; 41, \$2095, 145 days; 50, \$2360, 155 days.

Class 2. Eleven pneumatic hammers—Bidder 8, \$500, 30 days; 9, \$360, 20 days; 40, \$422, 30 days; 12, \$470, 30 days; 16, \$576.50, 30 days; 29, \$418, 30 days; 30, \$450, 8 days; 54, \$520, 30 days; 62, \$625, 25 days.

Class 3. Two pneumatic piston drills—Bidder 8, \$120, 30 days; 9, \$118.50, 20 days; 10, \$180, 30 days; 16, \$184, 30 days; 29, \$104, 30 days; 30, \$150, 8 days; 54, \$140, 30 days.

Class 4. One pneumatic riveter—Bidder 2, \$1453 and \$2618, 90 days; 16, \$845, 75 days.

Class 5. One yoke riveter—Bidder 8, \$250, 30 days; 16, \$688, 50 days; 30, \$150, 8 days.

Class 7. One pneumatic geared hoist—Bidder 8, \$450, 30 days; 16, \$499, 30 days; 18, \$404, no time; 44, \$385, 30 days; 62, \$500, 30 days.

Class 8. Five electric drills—Bidder 8, \$500, 30 days; 16, \$518.75, 30 days; 18, \$487.45, 21 days; 25, \$540, 30 days; 36, \$475, 30 days; 37, \$522.50, 30 days; 45, \$497.50, 20 days.

Class 13. One vacuum pump—Bidder 7, \$85, 10 days; 16, \$87.40, 20 days; 18, \$81.75, 12 days; 34, \$83.38, 45 days; 37, \$85, 35 days, and \$85, 40 days; 59, \$81, 10 days, and \$73.50, 30 days; 62, \$90, 20 days.

Class 18. One motor—Bidder 37, \$20, no time; 60, \$19.40, 20 days; 69, \$15, 20 days.

Under bids opened August 12, circular No. 380, contracts for three steel dump barges has been awarded to the Maryland Steel Company, Sparrows Point, Md., \$59,495.

Knox & Co., New York, have been awarded class 174, six duplex lever punches, \$168, under opening of September 10 for machinery for the navy yards.

The following awards have been made for supplies for the navy yards, bids for which were opened September 3:

Niles-Bement-Pond Company, New York, class 151, two jib cranes, \$2000.

Hilles & Jones Company, Wilmington, Del., class 152, one single punch and shear, \$1045.

Under opening of August 20 for supplies for the navy yards, the National Electric Supply Company, Washington, D. C., has been awarded class 139, one horizontal duplex pump, \$605.

Under opening of June 25, for supplies for the navy yards, the General Electric Company, Schenectady, N. Y., has been awarded class 1, one motor generator set, \$7775.

The National Founders' Association.—The convention of the National Founders' Association for 1907 will be held at the New Hotel Astor, New York City, which has been the meeting place for the past two years. The Administrative Council will meet on Monday and Tuesday, November 11 and 12, and the convention sessions will be held November 13 and 14. On Wednesday evening, November 13, the annual banquet will be held, and speakers of national reputation will attend.

Trade Publications.

Machinery, Tools and Forgings.—Billings & Spencer Company, Hartford, Conn. Library of catalogues. As a whole they describe the complete line of articles manufactured, including a great variety of tools, &c. This company manufactures patent improved drop hammers and other heavy forging machinery, various machinists' tools, solid and adjustable wrenches, fine tools and a complete line of automobile forgings, &c. Each department has its own catalogue, which is profusely illustrated and printed on coated paper. They are all bound in uniform size, 5 x 7½ in., and uniform cover designs, with the exception of the machine wrench list and a duplicate on a small scale of the general catalogue of machinists' tools. These catalogues make very handy books of reference for the general mechanic and tool maker, as well as the jobber and manufacturer.

Coal Mining Machinery.—Ingersoll-Rand Company, 11 Broadway, New York. Pamphlet 53A. Gives information concerning the various machines for the coal mine manufactured by this company. Ten entirely distinct lines of apparatus are treated of, all claimed to be up to date and of the highest efficiency in their respective classes.

Gas and Gasoline Engines.—Western Malleable & Grey Iron Mfg. Company, Milwaukee, Wis. Two catalogues. Both deal with the Simplicity gas and gasoline engines. The first gives an exhaustive description of the engines and their details. The second treats less of details, but shows numerous examples of uses to which the engines may be put, as in the driving of pumps, portable saws, feed grinders, elevators, &c. The engines are furnished in stationary and portable forms, and the claims on which most emphasis is laid are surplus of power, small number and great strength of parts, reliability under all conditions, ease of operation, and beauty of design and finish.

Railroad Motor Cars.—Strang Gas Electric Car Company, 15 Wall street, New York City. Catalogue. Size, 8½ x 10½ in.; pages, 18. Gives a comprehensive illustrated description of the Strang railway motor car. This car, as described in *The Iron Age* February 22, 1906, is an electric car driven from a contained gasoline engine generator unit. The advantages in its use are set forth, and in brief may be summarized in the statement that it affords an electric traction system independent of power houses, third rail or overhead systems, and rail bonding.

Crushing and Road Machinery.—Climax Road Machine Company, Marathon, Cortland County, N. Y. Catalogue. Size, 8 x 10½ in.; pages, 24. Practically everything that has to do with road construction is manufactured by this company, and this catalogue is devoted to such equipment. The illustrations and descriptions pertain to crushers, portable crushers with elevator and chute screen attached, revolving screens, screens in connection with portable storage bins, portable boilers and engines, traction engines and rollers, wagons, road machines, highway bridges, sprinkling wagons, scrapers, plows, &c.

Steam Specialties.—Crane Company, Chicago. Pamphlet: 96 pages. Issued to briefly review and illustrate the company's more important lines of valves, fittings and special appliances to which particular attention is called. In a sense it is a forerunner of a revised complete pocket catalogue now in course of preparation, which will cover the 10,000 or more different articles made for use with steam, water, gas, oil, &c. An inclosed circular (No. 29) concerns Kilgerit heatproof and indestructible packing, giving price-list of sizes carried in stock.

Steel Castings and Street Railroad Supplies.—Falk Company, Milwaukee, Wis. General catalogue. Size, 8 x 11 in.; pages, 92. Handsomely illustrated with large half-tones of the interior of the company's plant and products. For convenience the subject matter is divided into sections, as follows: Open hearth steel castings and the company's steel department, motor gears and pinions, special track work, the Falk cast welded rail joint. Among the notable steel castings that have been turned out by the steel department is a hydraulic turbine casing, shown in process of molding and completed, weighing 84,480 lb. Other large turbine castings are shown and a list given of the classes of work the foundry is equipped to handle. These briefly are castings for mining and sawmill machinery, traction engines, threshing machinery, power plant equipment, dredging machinery, locomotive and traveling crane castings, and railroad and bridge castings.

Power Transmitting Appliances.—Medart Patent Pulley Company, Potomac and DeKalb streets, St. Louis, Mo. Catalogue and price-list No. 26. Size, 6¼ x 9¼ in.; pages, 320; cloth binding. Supersedes all previous editions and illustrates and describes the company's line of power transmitting machinery. This includes everything for the transmission of power by belts, manila and wire rope, chain belts and gears, such as wrought rim, cast iron and wood split pulleys, shafting, friction clutches, hangers, coupling, pillow blocks, sprocket wheels, &c. A complete index is appended.

Motors and Generators.—The Barlett Electric Mfg. Company, Cincinnati, Ohio. Bulletin No. 5. Deals with type

E motors and generators for direct current, which are claimed to withstand hard work and rough usage. The parts are dealt with separately, and general information and tables of dimensions and ratings are given.

Pipe and Machine Tools.—F. E. Wells & Son Company, Greenfield, Mass. Pamphlet and circulars. The pamphlet gives illustrations, short descriptions and prices of pipe tools, including stocks and dies. Wells' pipe-threading machine, pipe wrenches, cutters, alligator wrenches, Always Ready wrenches and Kid vises. The four circulars pertain respectively to a plain cutter and reamer grinder, a manufacturers' lathe for small jobs (described in *The Iron Age* September 5, 1907), a manufacturers' lathe which is a combination of the company's regular speed lathe and manufacturers' lathe, and Wells' speed lathes.

Inspection Cars.—Light Inspection Car Company, Hagerstown, Ind. Twelfth annual catalogue. Devoted to Hartley & Teeter light inspection cars and gasoline motor cars, which are built to suit any gauge of railroad track. The pedal cars are made in single, double and double with extra front seat types. When the high gear is used the motor car is claimed to obtain a speed of from 20 to 25 miles an hour, and on the low speed about 7 miles per hour. Testimonial letters are appended.

Traveling Cranes.—General Pneumatic Tool Company, Montour Falls, N. Y. Bulletin No. 58. Deals with electric traveling cranes and shows installations of various types and sizes. The trolley, gearing, brakes, switches, bridge trucks, bridge operator's cage, controllers, motors, hoisting cable, load block and lubrication of the company's standard type crane are described and illustrated, and some suggestions to purchasers are included.

Steam Specialties.—Hills-McCanna Company, 128 East Kinzie street, Chicago, Ill. Pamphlet. Calls attention to several steam specialties—namely, lubricating pumps, graphite attachment for lubricating pumps, high pressure gauge cocks and low water alarm and fusible plug.

Grinding and Polishing Machinery.—Webster & Perks Tool Company, Springfield, Ohio. Pamphlet. Gives illustrations, specifications and prices of a 1-in. bench grinder, 1¼-in. self-oiling bench grinder, 1-in. grinder on pedestal, 1¼-in. self-oiling grinder, 2-in. self-oiling grinder, and improved Nos. 1 and 2 self-oiling buffing and polishing lathes. The automatic oiling device is also described.

Railroad Track Tools.—Verona Tool Works, Pittsburgh, Pa. Catalogue. Size 7 x 9¼ in.; pages 67. This book is entitled "Railroads Old and New," and gives a pictorial account of the progress made in steam railroads since 1803 up to the present time. Half-tone engravings show some early types of railroads and modern concrete and steel girder railroad bridges. The company's complete line of track tools are illustrated, described and listed.

Pulleys.—Jones & Laughlin Steel Company, Pittsburgh, Pa. Standard price-list of machine molded cast iron pulleys of the solid single arm, solid double arm, clamp hub, split, tight and loose, self-oiling tight and loose, and flange types. Dimensions and weights of balance wheels are also given.

Compressors and Vacuum Pumps.—American Air Compressor Works, 26 Cortlandt street, New York City. Bulletin No. 18. Illustrates and describes the company's box bed-plate compressors and vacuum pumps. Attention is also called to other styles, sizes and types manufactured but not shown, and to the fact that the company also makes complete installations, including pneumatic tools, &c.

Tool Steels.—Halcomb Steel Company, 79 South Jefferson street, Chicago. Blotter. Carries colored facsimiles of the labels which are attached to the company's various grades of steel, including S&B high speed tool, air hardening tool, Ketos oil hardening, double special tool, special tool, double extra tool, extra warranted tool and standard tool steels. At one side of each is printed the uses for which each brand of steel is particularly adapted, and at the right the proper forging and tempering treatment. An attached leaf mentions specialties—milling cutter disks, polished drill rods, high grade sheet steel and forgings made to order.

Conveying and Transmission.—Stephens-Adamson Mfg. Company, main office and works, Aurora, Ind.; Chicago office, First National Bank Building. August number of a monthly publication relating to conveying and transmission machinery. Contains articles on trade outlook and business conditions, and suggestions as to the treatment of advertising matter, together with pertinent observations concerning shop economy and business management. Particular attention is given in this number to the S-A metal apron conveyors, for the handling of crushed rock, ore, gravel, coal, &c. Systems of this kind are illustrated by half-tone and line engravings, which show the construction and manner of operation of this equipment.

With the closing of work September 14, the Georgia Iron & Coal Company, which operates the Rising Fawn Furnace and a number of mines in Georgia and Alabama, indefinitely shut down its plant at Rising Fawn.

HARDWARE

THE annual report of Sears, Roebuck & Co., which has just been published, emphasizes the continued growth of the retail mail order business and the great place it is coming to hold in the distribution of merchandise. It appears while during the calendar year 1905 the company's net sales were \$27,604,253, and in 1906 were \$37,943,472, that for the year ending June 30 last they were \$50,722,839. There is thus an increase in the volume of business for the year covered by the report of more than 80 per cent. over that of the calendar year 1905. These figures enforce the seriousness of the competition which the regular merchants are called upon to meet and the need for unrelaxing efforts and increased enterprise and energy in their conduct of business. There is also brought up anew to wholesale distributors and manufacturers serious problems in regard to the effect of the mail order business on the regular distribution of merchandise. In this condition of things, which does not promise to become more favorable for the marketing of goods in old channels, it may be that the manufacturers and jobbers will have to see to it that the retail merchants of the country obtain their goods on something like as advantageous terms as do the catalogue houses.

The steady increase in the volume of business between the United States and Canada is notable and gratifying. This is the case especially in view of the legislative efforts which are made by the Dominion, primarily to develop domestic manufactures, but at the same time if goods must be imported to have the orders go to England because of the diminished duties to which English goods are subject. The growing trade of this country is thus obtained in spite of two obstacles—the sentiment which calls for a preference being given to the mother country, and the legal barriers erected to foster home industry. The fact that neither of these counts greatly against the success of those on this side the line in seeking the Canadian market illustrates principles of wide applicability in broader and narrower fields.

The United States in its dealings with Canada possesses the great advantage of proximity. There is no intervening distance to keep the countries apart. Only a few hours separate their important commercial and manufacturing points. It is a frequent and commonplace thing for the representatives of our mercantile and manufacturing interests to visit the markets of the Dominion whose people are in close touch with ours. Communication by mail is prompt and easy, and the shipment of goods involves but little delay. Business can thus be transacted without the loss of time involved in transatlantic trade, and with the quickness and dispatch which are characteristic of modern methods.

The fact that sentiment does not greatly count in business, especially in international business, is illustrated by the fact that Canadian merchants and the Canadian people will not sacrifice their interests or convenience for the sake of actual or suppositious attachment to Great Britain. They are glad to avail themselves of the advantages of the protection accorded them by the Empire without expense to them or the sacrifice

of their independence, but this does not deter them from building up their own industries and endeavor to become self-sufficient. Nor are the Canadian people willing to purchase English goods unless they suit them as well as the American, and are procurable at as advantageous prices. But the goods made a long way from home under very different conditions are not in many cases as well adapted to their requirements and tastes as those made across the border, and many orders go to the United States.

Condition of Trade.

The past week has not been eventful in the Hardware market. There have been few changes in price and business has continued in fair volume. The demand upon manufacturers by the larger trade is sufficient to keep factories well occupied, and in some lines there is difficulty in obtaining prompt shipment. The market gives evidence of the effect of the great increase in manufacturing facilities which has marked the trade during the past few years, as most factories are in a position to meet with at least a fair degree of promptness the demands made upon them. There are no especial disturbing influences agitating the Hardware market, and in general a satisfactory tone characterizes prices, except in Copper products and a few other lines. A normal trade which in volume compares well with former years is being taken care of by the jobbing houses, most of whom are well stocked but not over stocked, and in a position to give good service to their customers. The indications point to an excellent business during the fall, especially in the agricultural sections which will be slow to feel the effect of any curtailment of enterprise which may occur in the industrial and manufacturing centers on account of a disposition to defer projected enterprises owing to financial stringency and the pursuing of a careful and conservative policy. Fortunately in the Hardware market there is nothing to cause disquietude or to interfere with the prosecution of business on a liberal scale, with the judicious purchase of goods sufficient to cover reasonable requirements for the season. While there is no temptation to indulge in speculation, merchants and manufacturers are apparently justified in making preparations for a good season's business.

Chicago.

Reports concerning crop conditions from salesmen covering a wide area of Western territory are in very close agreement with the recent Government report. There are, of course, numerous spots showing serious shortage, some of one cereal, and some of another, in various parts of the country. In the South the high price of cotton, in a large measure, counterbalances in money value the deficiency in yield. The same is true in a greater or less degree of the crops throughout the North and West. Barring the possibility of a damaging frost of wide extent—which by reason of the continued favorable weather is growing more and more remote—there is nothing in the agricultural situation, as it now appears that presents a threatening appearance. The effect of the spectacular slump in copper is reflected in lower prices on all copper goods. Articles of manufacture into which this metal enters as a component part will naturally be affected in a greater or less degree according to the proportions in which it is used. The less intimately associated wares will respond to the declining tendency more slowly, but evidence of weakness is making its appear-

ance even here, especially in lines that have closely followed the upward movement of copper. The reduction in price of spelter has not yet affected galvanized sheets, which, according to all reports, are firm, although the principal producers are still weeks behind on deliveries. Jobbers are able to supply urgent stock deficiencies from independent mills with reasonable promptness. The recent advance in Wire Nails has been well sustained, and mill shipments, though coming forward in large volume, are not in excess of requirements. Jobbers have so far not been able to accumulate stocks ahead. It is apparent, too, that retailers' purchases represent actual needs and are in no sense speculative. Erroneous press reports have within the past few days created an impression of weakness in Steel Wire prices. This is, of course, incorrect, and was doubtless the result of confusing this product with Copper Wire. Trade in general continues to hold up fairly well, and though easing off in certain directions is noticed, it is not of such extent as to be seriously felt. Heavy Hardware interests report an unimpaired demand from implement makers, wagon, carriage and blacksmith shops. A feeling of uncertainty as to future developments is perhaps the most unfavorable influence now affecting the market. This at the present time is, however, largely a matter of sentiment, and is not founded upon any dissatisfaction with the present state of trade. Altogether, it would seem from a survey of general trade conditions that any worries entertained must have to do with the future, rather than the present.

NOTES ON PRICES.

Wire Nails.—The Wire Nail market continues in excellent condition, with a fairly active demand upon the manufacturers and a good movement from the jobbers to the retail merchants. The stocks in the hands of the jobbing trade are in many cases at least somewhat broken, but shipments are being made by the mills in good quantities. Many of these deliveries are on orders placed before the recent advance, which some of the large houses apparently expected, while to others it came as a complete surprise. There has been some complaint of slight irregularity in prices, owing to concessions made by the smaller manufacturers, but within the past week this condition has in good measure been corrected. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers.....\$2.05
Carload lots, to retail merchants..... 2.10

New York.—The New York market shows but little change, with a fair but not especially heavy demand. Local jobbers and Nail houses are holding small lots from store at \$2.35, base, and in general this price is fairly well maintained. 2.35-

Chicago.—Heavy specifications against the large amount of contract orders now on the mills' books continue to come in. In view of the heavy buying that preceded the recent advance new business is not especially large, though a fair amount is being offered at the new price. Quotations are as follows: \$2.23 in car lots to jobbers, and \$2.28 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—We note that new demand for Wire Nails is only fair, most of the large trade having covered requirements for some time ahead, prior to the advance in prices. Some of the large jobbers are not adhering strictly to prices charged the retail trade for Nails in small lots, while a few of the outside mills are also shading prices to slight extent. In a general way, however, the market is fairly strong, and the mills are now making more satisfactory deliveries than for some time, having caught up to large extent on back orders. The supply of Steel and of cars is now said to be quite sufficient to meet the requirements of the mills. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers.....\$2.05
Carload lots, to retail merchants..... 2.10

Cut Nails.—The advance in Cut Nails which should automatically have followed the advance in Wire Nails has apparently failed to materialize. While some manufacturers are naming higher prices there is little difficulty in obtaining Nails either East or West at the former figure, and the market is represented by the following quotations, f.o.b. Pittsburgh. Steel Nails, carloads, \$2.10 to \$2.15; less than carloads, \$2.15 to \$2.30. Iron Cut Nails usually command a 10-cent better price.

New York.—The Cut Nail market is fairly well maintained, the price being represented by \$2.35 on small lots, concessions being, however, sometimes made.

Chicago.—From the fact that the automatic advance of 5 cents a keg scheduled to follow the advance in Wire Nails is generally disregarded in quotations, it is expected it will not become effective. The demand is only fair, and owing to the lateness of the season no great improvement is looked for. Quotations are as follows: Iron Cut Nails, carloads, to jobbers, \$2.38; to retailers, \$2.43; Steel, to jobbers, in carloads, \$2.28; to retailers, \$2.33.

Pittsburgh.—There is only a fair demand for Cut Nails, the mills having caught up pretty well on back orders, and are now able to ship Nails out promptly. There is some unevenness in prices, there being no trouble in getting Nails at \$2.10, and in some cases this price has been shaded on shipments to certain points. Official prices, which are shaded 5 cents per keg or more, are as follows, f.o.b. Pittsburgh: Carload lots, to jobbers, \$2.15; less than carloads to jobbers, \$2.20; less than carloads, to retailers, \$2.30. Iron Cut Nails at points west of and including Buffalo and Pittsburgh are held at 10 cents advance on Steel Cut Nails.

Barb Wire.—The manufacturers are busy making deliveries on old contracts. There is also a fair amount of new business. The advanced prices recently announced are generally maintained, there being a little complaint of concessions by smaller mills. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots.....	\$2.20	\$2.50
Retailers, carload lots.....	2.25	2.55
Retailers, less than carload lots.....	2.35	2.65

Chicago.—While specifications on old contracts constitute the bulk of business received, there is considerable new business coming in on fall orders. Shipments are heavy and prices are firmly maintained. We quote as follows: Jobbers, Chicago, car lots, Painted, \$2.38; Galvanized, \$2.68; to retailers, car lots, Painted, \$2.43; Galvanized, \$2.73; retailers, less than car lots, Painted, \$2.55; Galvanized, \$2.85; Staples, Bright, in car lots, \$2.35; Galvanized, \$2.65; car lots, to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—New demand is light, the mills running mostly on specifications against old contracts, which are still being received. The leading mills are said to be observing prices, but some of the smaller mills are not adhering rigidly to official quotations. Official prices, which are shaded to some extent, are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots.....	\$2.20	\$2.50
Retailers, carload lots.....	2.25	2.55
Retailers, less than carload lots.....	2.35	2.65

Smooth Fence Wire.—A heavy demand is being made upon mills from the manufacturers of Wire products, and a good many orders are also being received from merchants. There is little complaint of irregularity in prices, the late advance being well maintained by the manufacturers.

Chicago.—Woven Wire and other fence manufacturers are urgently demanding shipments to replenish their stocks. Business is good both as respects new orders and specifications on old contracts. Quotations are as follows: In car lots, to jobbers, \$2.08 f.o.b. Chicago, and to retailers, \$2.15.

Pittsburgh.—We note a continued heavy demand for Fence Wire, which is taxing the capacity of the mills to supply. Consumers are still urging prompt shipments

against contracts placed some time ago, and the tone of the market is firm. Quotations for base numbers 6 to 9 are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....	\$1.90
Retailers, carloads.....	1.95

Scythe Snaths.—The opening market on Scythe Snaths for the ensuing year exhibits noteworthy uniformity as compared with last year's market. Leading manufacturers seem to be holding to quotations, which represent considerable advances. On the new basis the price to the retail trade may be represented in a general way by a discount of 55 per cent., but the jobbing trade are in many cases in a position to supply the goods at the old figures.

Home Companion Tool Sets.—Goodell-Pratt Company, Greenfield, Mass., maker of the No. 713 Home Companion Tool Set, illustrated and described on another page, states that the net price of this Set to the trade is \$10.50.

Bolts and Nuts.—As has been suggested in these columns, the market for Bolts and Nuts during the past few weeks has lost some of the marked strength which has been its characteristic feature for so long a period. Smaller manufacturers began to make slight concessions for the purpose of filling up their depleted order books, and larger manufacturers also evinced an increasing interest in new business, showing that they were catching up with their accumulation of unfilled orders. As is usually the case reductions in one quarter of the market were followed by corresponding and perhaps slightly greater concessions by other interests in competition for the slackening volume of business obtainable. The following quotations on Carriage and Machine Bolts, &c., are given as representing in a general way the prices now ruling, subject to the usual concessions in the case of jobbers and other large buyers:

Common Carriage Bolts, 3-8 x 6, smaller and shorter, cut thread.....	70 and 5 %
Common Carriage Bolts, 3-8 x 6, smaller and shorter, rolled thread.....	70, 10 and 5 %
Common Carriage Bolts, longer or larger than 3-8 x 6.....	65 %
Machine Bolts, 3-8 x 4, or shorter and smaller, with H. P. or C. P. Plain Nuts, cut thread.....	70 and 7½ %
Machine Bolts, 3-8 x 4, or shorter and smaller, rolled thread.....	70, 10 and 7½ %
Machine Bolts, with H. P. or C. P. Plain Nuts, larger or longer than 3-8 x 4.....	65 and 5 %
Machine Bolts, all sizes, with C. and T. Nuts.....	60 and 10 %
Machine Bolts, 4 x 3-8, smaller and shorter, without nuts, with cut threads.....	70, 10 and 7½ %
Machine Bolts without Nuts, longer than 4 in.....	65, 10 and 5 %
Machine Bolt Blanks.....	65 and 5 %
Bolt Ends, with H. P. or C. P. Plain Nuts.....	65 and 5 %
Bolt Ends, with C. and T. Nuts.....	60 and 10 %
G. P. Coach Screws.....	75, 10 and 5 %
Cone Point Lag Screws.....	75, 10 and 10 %
Forged Set Screws and Tap Bolts.....	50 and 10 %

A corresponding reduction has also been made in Hot Pressed Nuts, which are now quoted in small lots at the following prices:

	Off list.
Hot Pressed Blank Square Nuts.....	5.30c.
Hot Pressed Blank Hexagon Nuts.....	5.70c.
Hot Pressed Tapped Square Nuts.....	5.20c.
Hot Pressed Tapped Hexagon Nuts.....	5.60c.

Cold Punched Nuts remain practically unchanged as follows:

	Off list.
Cold Punched Plain Blank Square Nuts.....	4.70c.
Cold Punched Plain Blank Hexagon Nuts.....	5.00c.
Cold Punched C. T. and R. Blank Square Nuts.....	5.00c.
Cold Punched C. T. and R. Blank Hexagon Nuts.....	5.60c.
Cold Punched Plain Tapped Square Nuts.....	4.70c.
Cold Punched Plain Tapped Hexagon Nuts.....	5.00c.
Cold Punched C. T. and R. Tapped Square Nuts.....	5.00c.
Cold Punched C. T. and R. Tapped Hexagon Nuts.....	5.60c.
Semifinished Nuts.....	80 per cent. discount.
Finished and Case-Hardened Nuts.....	70 and 10 per cent. discount.

The above quotations on Nuts are subject to the usual concessions to the jobbing trade.

Copper Products.—Copper and related materials are still nominally quoted at the various bases formally established, but these prices are no criterion of actual trading conditions. No business beyond imperative requirements is being placed, and concessions from the nominal rates

are practically universal. Buyers maintain the same indifference that has prevailed for several months, and there will be no marked change until they are convinced bottom has been reached. A readjustment of base prices may be agreed on in the near future, but the course of the market in these goods is problematical until, with the reduced production of ingot and the continued consumption of high priced material, something like normal may be reached. At present prices depend somewhat on the necessities of the seller. As illustrating the condition of the market, it may be noted that a recent quotation on Sheet Copper is 20 cents, base. Last week the base price on Bare Copper Wire was fixed at 16¼ cents, base, in large lots.

Bull Rings.—There has been a considerable break in the price of Copper Bull Rings, quotations showing a decline of about \$1.00 per gross. The movement, of course, results from the decline in copper, which, however, has not yet been fully reflected in the market for this line.

Hose Couplings, Nozzles, &c.—Announcement has been made of the season's prices on Hose Goods, such as Couplings, Nozzles, Pipes, &c. There are some declines from the prices made last spring at the time of the high level of Copper and Brass, but quotations are still somewhat above those made at the opening of the market a year ago.

Steel Goods.—Although the new prices on Steel Goods have not yet been widely circulated, advance information regarding them has been obtained in some quarters. It was generally understood that prices would be higher, but advances seem to be somewhat greater than was expected. Taking the different lines generally, Hay Forks are about 12½ per cent. up and Manure and Spading Forks, 5 per cent. Hoes show advances of from 10 to 12½ per cent. Steel Garden Rakes are 10 per cent. and Malleable Rakes 20 per cent. higher than last year's prices.

Chisels and Drawing Knives.—As stated last week, established prices on Chisels, &c., were reaffirmed at a recent meeting of the leading manufacturers. It is reported, however, that the market is not over firm. Business is rather light in volume and some manufacturers appear to be endeavoring to stimulate it by offering concessions for good sized orders from the largest buyers.

Window Glass.—Nothing new is to be reported in the Window Glass situation, workers and manufacturers continuing to hold antagonistic views as to the wage scale. Nothing in the way of large production of Glass is expected for a month or two and perhaps longer, and if cold weather should make its appearance earlier than usual it would materially reduce the stocks of Glass, bringing about a stiffer market and perhaps warranting an advance in prices. Quietness characterizes the local demand and prices are reported as ranging, according to the anxiety of sellers, from 90 and 10 to 90 and 15 per cent. discount on single, and from 90 and 10 to 90 and 20 per cent. discount on double strength Glass from the jobbers' list, October 1, 1903. Western jobbers' discounts are reported as being 90 and 10 per cent. discount for the first three brackets of single thick; 90 and 15 per cent. for other brackets of single thick and 90 and 20 per cent. discount for all sizes of double thick, from the same list.

Rope.—Business in Rope seems to be picking up somewhat, and with the increasing demand regular prices are quite firmly adhered to and shading is exceptional. Quotations continue unchanged as follows: Pure Manila, 12½ to 12¾ cents; B quality, 11½ to 11¾ cents; Pure Sisal, 9 cents; lower grades Sisal, 7¼ to 8 cents; No. 1 Jute, ¼ in. and up, 9 cents; No. 2 Jute, 8 cents.

Linseed Oil.—Another advance of 1 cent a gallon on Oil is to be chronicled. The seed situation is pretty strong, while the demand from crushers throughout the country has been steadily increasing. The volume of business at the advanced figures is of considerable proportions. New York quotations for Oil, according to quantity, are as follows: City Raw, 46 to 47 cents per

gallon; Out of Town Raw, 45 to 46 cents per gallon; Boiled Oil, 1 cent a gallon over Raw.

Spirits Turpentine.—During the week the price of Turpentine has declined. The market is quiet, and trading is largely limited to purchases for immediate requirements. New York quotations are as follows, according to quantity: Oil Barrels, 53½ to 54 cents; Machine Made Barrels, 54 to 54½ cents.

Hardware Store Advertising.

HOLDING PUBLIC ATTENTION.

BY CLARFIELD.

Go out and shoot a man, commit a robbery, or even tip over a peanut stand, and you will hold public attention of a certain kind for a certain period of time. Successful retailing demands that the attention of the public shall be held from day to day after it is once attracted. The once quite popular method of sensationalism along these lines has happily passed chiefly out of vogue. It doesn't pay; that's probably the reason, and it is a good one.

Well Balanced Announcements.

Still, carefully planned well balanced announcements are even yet far from being the general rule. One merchant pounds away incessantly upon the bargain cry, low prices and money savings. Always cost sales, removal sales, fire sales, and Heaven knows what not, until some bright morning he wakes up to the fact that he is regarded as the "cheap" store of the town, the trash vender, for he has taught his trade to believe that he sacrifices everything in order to throw out the inducement of a low price. He may carry reliable lines and good assortments, but it will take months of severe effort to drum that fact into the public noodle after the other notion has become supreme.

The Other Extreme.

Another merchant persistently publishes dignified announcements of the formal, "classy" style, probably with slight direct results, and always creating the impression that his goods are of the ultra, upper ten variety that cost more to possess than those of some competitor. This may not be strictly true, and he may be "holding public attention" to the extent of a casual perusal of his announcements, but with far from the most desirable effect, which is, of course, to get people into his store and make sales.

Sensible Business Talk.

The same qualities that make a good salesman in the store ought to make a good salesman of the paper in which the announcements appear, but, unfortunately, not all good salesmen are able to put their salesmanship on paper. It is a good rule to give plain business talk. If the merchant possesses the happy faculty of expressing himself in a witty turn, all right, but be careful of this. It may not seem so funny in print.

Give the Public What It Wants.

Be as careful to choose goods and topics that are seasonable as you are to wear seasonable clothes or to display seasonable merchandise in the store. If a certain line of goods has shown good results in yesterday's advertisement, try a kindred line to-day. The first announcement has found the trend of public thought; the second may be even more successful.

Feature Business, Not Personality.

The day of "the joiner" is on the wane. It is not now as profitable as in former days to join every society within reach "for business reasons." Personality of the sturdy and jovial sort is valuable, but it is the business, its methods and principles, that interest and influence the public mind most. The merchant who is chief of the local fire department, president of the club and lord great pow-wow of something else may be personally greater in the public view than some competitor without doing a fraction as much business. Too often these personal efforts to keep before the public sap the business of the time and attention it ought to have, and the man who

puts his personality into the business and then places the business ahead of everything else is the one who most successfully holds public attention.

THE BELKNAP MAGAZINE.

WITH the autumn number issued a few days since the Belknap Hardware & Mfg. Company, Louisville, Ky., has launched a full fledged magazine, which will doubtless meet with a hearty welcome at the hands of the trade. The *Belknap Magazine* is finely printed and profusely and attractively illustrated, no expense having been spared in making it of interest and value. The pages, 96 in number, are of the usual magazine size, with front and back covers strikingly printed in colors, the former presenting a view of an Oriental Hardware store and its proprietor, and the latter a lumbering scene. In regard to the purpose and scope of the magazine, the company has the following to say:

The *Belknap Magazine* is intended to be something different from a trade paper. Its purpose is to form a common meeting ground upon which we may seek to be useful to our customers, and at the same time offer them something that will interest and entertain them—and a place in which they may get in touch with us and other merchants by offering suggestions, or asking advice as to vexatious business problems.

It is impossible entirely to dissociate sentiment and business. Perhaps it is, in a measure, possible in a young house, but when an establishment has been in successful operation for more than half a century, many sentimental ties are sure to have been formed. Such a house necessarily merits, and is honored by the strong confidence of those who patronize it. This confidence is, of course, mutual, and from it springs a friendship which constantly seeks vehicles for expression.

Considered as such, a medium for the interchange of good will and business helpfulness, we trust that the *Belknap Magazine* will be an unqualified success, and that its progress and development will be a matter of interest to thousands of Hardwaremen in all parts of the country.

Among the special articles in the first number are "Oriental Trading," by William R. Belknap, president of the company; "The Old Hardware Store," a poem; "The Importance of Hardware," "The History of Heat," "Everything in Hardware," a story; "The Evolution of Cement," "Success in Good and Bad Times," "How Enamel Ware is Made," "The Early History of Copper," "The Modern Uses of Copper," and "How a Good (Horse) Collar is Made." In addition there are some thoughts, "From the Editor's Chair," besides departments entitled, "The Clerks' Club," "New Things in Hardware" and "Hardware Advertising," the last page of the reading contents being devoted to "Publishers' Talk," in which those responsible for the magazine will from time to time have something to say of an intimate and personal character with the readers of the publication.

The magazine contains a large amount of advertising, which has been gotten up in exceptionally clever and attractive typographical style, the different announcements occupying quarter, half and full pages as in the regular periodicals of this class. These advertisements which are in up to date magazine style relate exclusively to the articles and lines handled by the company. A confidential net price-list of goods advertised is also issued in a separate sheet, the purpose of which is to make it easy for the merchant to order intelligently.

In order to get the magazine out on the time originally determined upon, considerable matter which it had hoped to use was crowded out. One of these articles on "The Business Outlook" was deemed of sufficient importance to warrant the company in printing it separately, and this article is included in the magazine in the shape of a folder.

In this elaborate and noteworthy effort to entertain and instruct and at the same time direct attention to its business, the company is to be warmly congratulated and commended. The magazine is certainly a very creditable production and a notable advance in trade literature, and will, we doubt not, be highly valued by those who receive it.

SUGGESTIONS ON EXPORT TRADE.

BY LEWIS D. BOGGS.

THE growth of export business in the United States of manufactured products has not been as great as it should be, particularly so in the varied lines of Hardware, in which we come in direct competition with England and Germany. The latter country has been more progressive than either England or the United States and has carefully considered and studied the wants and desires of the merchants. This is especially true in countries where the long usage of certain styles of goods precludes substitutions.

American Manufacturers Too Frequently Ignore suggestions in many seemingly small matters, but which are of great importance to merchants and buyers in foreign countries.

They do not give the proper attention to the packing of goods.

Cases do not run uniform in size or weight.

Price-lists which are sent out in many instances are confusing, as net and discount goods are on the same sheet.

Catalogues are filled with descriptive matter which is meaningless to the average foreigner.

Proper care is not taken in the execution of invoices or the marking of cases. These are very important, as the customs rules and regulations in most countries have to be lived up to; otherwise a fine. For example, the instructions on an export order read net and gross weight in kilos; marks and numbers to be stenciled. Instead, the weights are given in pounds and ounces and the cases marked with a brush. Then, too, the weights are inaccurate.

Three invoices are requested; one is sent.

So one could go on ad libitum citing things of this sort, which seem trivial to the American manufacturer, but which if they knew it influence the placing of many orders with English and German concerns, where they are assured that proper attention will be given to details of this character, thereby eliminating considerable trouble, expense and annoyance which the American manufacturer forces upon them.

In Spanish Speaking Countries

especially, we have not properly studied their wants in goods that are staple with them. If they want an article a certain size and shape, such as they have been accustomed to use for years, and we do not make it just the size and style, we try to force them to take what we do make, which is a fatal mistake; a mistake which Germany has been quick to take advantage of.

In a sense they are a primitive people; not the merchants, but the actual users of the goods. They are slow to take advantage of improved articles, and in this respect are similar to the Chinese. What was good enough for their forefathers is good enough for them, and that is what they want.

If we had made 15 or 20 years ago the goods they wanted, we would have had the opportunity of gradually working into our own particular patterns. This we are doing, but slowly, without the orders for their own style goods. A few manufacturers have sent direct representatives to these countries and studied the wants of the people, and the results have been most gratifying. For example, a well-known Axe manufacturer gets out a Spanish catalogue in which illustrations are given of many styles of Axes which have never been used in this country; Machetes, &c., which we also do not use. If Hardware manufacturers in general could see some of the orders that come up from South America for these goods, to use the vernacular, they would sit up and take notice.

Our export business in general has been growing by leaps and bounds, but the American manufacturers of general Hardware have, in my opinion, been fast asleep, wrapped in their own egotism and conceit.

F. J. Hoerger has disposed of his Hardware, Stove, Paint and Sporting Goods business at Sutton, Neb., to Pfeiffer & Griess, who continue at the old stand.

CONTENTS.

	PAGE.
The Bethlehem Steel Company's New Plant. Illustrated.....	831
The Diamond Belt Shifter. Illustrated.....	838
New Massachusetts Boiler Rules.....	839
An Elevator Suggestion for Preventing Accidents.....	839
The De La Vergne Oil Engine. Illustrated.....	840
Molding Sand Produced in 1906.....	842
The Canedy Gasoline-Driven Pumping Engine. Illustrated..	843
Production of Coal in the United States from the Earliest Times to the Close of 1906.....	843
United States Manufacturers in Canada.....	844
The Common Law on Strikes.....	846
Cutler-Hammer Lifting Magnets.....	847
Alcohol for Operating Engines.....	848
Five Destroyers Contracted for.....	850
Steam Versus Electric Locomotives.....	851
A New Heavy Pittsburgh Lathe. Illustrated.....	852
A Handy Device for Machinists. Illustrated.....	853
Chronite Produced in 1906.....	853
The Nature of True Boiler Efficiency. Illustrated.....	854
The Page Woven Wire Fence Company.....	855
The Emery Steel Company.....	855
Copper Production in 1907.....	855
Editorial:	
Labor Questions in the German Iron Trade.....	856
Our Diminishing Balance of Trade.....	856
The Machinery Lease Dying Out.....	857
The Protection of Employees from Usurers.....	857
The Eastern Pig Iron Association.....	858
Correspondence.....	858
State Production in 1906.....	858
Bare Aluminum Wire for Electrical Machinery.....	859
Ohio Canal Traction.....	859
The Railroads of the World.....	859
The Tangled Railroad Rate Situation.....	860
Labor Notes.....	861
Personal.....	861
Obituary.....	861
Interstate Railroad Statistics.....	862
The British Iron Trade.....	863
An Alternating Current Coal Mining Installation.....	863
News of the Works:	
Iron and Steel.....	864
General Machinery.....	864
Power Plant Equipment.....	864
Foundries.....	864
Bridges and Buildings.....	864
Fires.....	864
Hardware.....	864
Miscellaneous.....	865
Drawback Regulations.....	865
The Iron and Metal Trades:	
A Comparison of Prices.....	866
Chicago.....	866
Philadelphia.....	868
Pittsburgh.....	869
Birmingham.....	871
Cleveland.....	871
Cincinnati.....	872
Metal Market.....	873
New York.....	873
Iron and Industrial Stocks.....	874
New Steel Rail Specifications.....	874
The Gayley Dry Air Blast at South Chicago.....	874
The Machinery Trade:	
New York Machinery Market.....	875
Chicago Machinery Market.....	876
Cleveland Machinery Market.....	877
Cincinnati Machinery Market.....	877
Philadelphia Machinery Market.....	878
New England Machinery Market.....	879
Government Purchases.....	880
The National Founders' Association.....	880
Trade Publications.....	881
Hardware:	
Condition of Trade.....	882
Notes on Prices.....	883
Hardware Store Advertising.....	885
The Belknap Magazine.....	885
Suggestions on Export Trade.....	886
The Fable of the Two Fishermen. Illustrated.....	887
Requests for Catalogues, &c.....	887
Death of Anthony Doherty.....	887
A Jobber's Method of Checking the Packing of Goods. Illustrated.....	888
Trade Items.....	888
Chicago Special Train to Atlantic City.....	889
New England Iron and Hardware Association's Outing.....	889
Price-Lists, Circulars, &c.....	889
New York State Hardware Association.....	889
The Trades 100 Years Ago. Illustrated.....	890
George Howard's Hardware Store. Illustrated.....	891
Harness Trimmings with Oxidized Copper and Nickel Finish.....	891
Parabola Luminous Dial Time and Alarm Clock. Illus.....	892
The Hoxie Expanding Bullet. Illustrated.....	892
Victor Belt Coupling. Illustrated.....	892
The Itsoezle Trouser Hanger. Illustrated.....	892
Combination Machinists' Pipe Cutter Vise. Illustrated.....	893
The Prince Ball Bearing Washing Machine. Illustrated.....	893
Four-Pour Ladle. Illustrated.....	893
Adjustable Window Screen. Illustrated.....	894
Improved Twentieth Century Mail Box. Illustrated.....	894
Bradley Metal Clasp Hall Hook. Illustrated.....	894
Home Companion Tool Set, No. 713. Illustrated.....	895
Locking Reel Band. Illustrated.....	895
Radiator Brush. Illustrated.....	895
Current Hardware Prices.....	896

THE FABLE OF THE TWO FISHERMEN.

THE NORVELL-SHAPLEIGH HARDWARE COMPANY, St. Louis, Mo., which keeps in close touch with its salesmen and gives them from time to time many suggestive pointers in regard to their work, has recently sent out to them the Fable of the Two Fishermen, with accompanying illustration, which we give reduced herewith. Its lesson in regard to the steady and courageous conduct of business may well be heeded by many a merchant who might timidly or lazily remit his efforts in consequence of the possibility of the development of less favorable conditions:

Once upon a time two men went a-fishing. It was a fine day and the fishing was good.

One of these men was very much interested in the Wall Street news. He was thoroughly posted on the prices of stocks and bonds. He would read and shake his head and predict the country was going to the "demnition bow-wow." He was so busy reading he neglected to put any bait on his hook. He also neglected to change the water in his bait can and all his minnows died. He did not catch any fish.

The other man in this fable attended strictly



The Fable of the Two Fishermen.

to the business of fishing. He kept his hook baited and also at frequent intervals gave his minnows fresh water. He enjoyed a fine day's sport and carried a long string of fish home to his family.

MORAL: You can't catch fish without bait.

APPLICATION.

Many merchants regulate their business by Wall Street financial reports. When there is a flurry in Wall Street they quit buying goods. Nothing is more expensive to a merchant than to be short of goods. The cost of doing business goes right on without any profit from sales.

The merchant who builds up his business and prospers is the man who governs his business policy not by what is happening a thousand miles away, but by conditions in his own neighborhood that surround his own business.

The merchant who expects to build up his business without a complete stock is surely no different from the fisherman who expects to catch fish without any bait.

THE PEDEN IRON & STEEL COMPANY, Houston, Texas, has materially enlarged its facilities for business. Its office and warehouse building is the largest occupied by a single firm in that city. It is three stories high, 135 x 350 ft. in extreme dimensions. It has a total floor space of 101,250 sq. ft. The company owns and has in use also a warehouse of corrugated iron, three stories high, 110 x 120 ft. in dimensions with a total floor space of 40,000 sq. ft. The company handles Heavy Hardware, Engines,

Pumps, Metals, &c., and covers Texas, Louisiana, Oklahoma, Old and New Mexico and Arizona.

REQUESTS FOR CATALOGUES, Etc.

The trade is given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM L. W. HENNEBERGER COMPANY, Paducah, Ky., whose Hardware, Stove, Tinware and Sporting Goods store was recently gutted by fire. The company is renovating its entire establishment.

FROM E. M. WARD, North Bend, Ore., who has succeeded Pettinger & Ward in the Logging and Mill Supply business.

FROM FALKENHAINER & KENKEL HARDWARE COMPANY, New London, Wis., which has succeeded the Laugesen Hardware Company. The stock carried covers Shelf and Heavy Hardware, Stoves, Agricultural Implements, Paints and Oils, Sporting Goods, Vehicles, &c.

FROM MACCARTHY & HARPER, 345 N. Calvert street, Baltimore, Md., who request catalogues and price-lists relating especially to House Furnishing Goods, which line they are going into extensively.

FROM BROWN & PRATT, who have lately commenced the Hardware, Agricultural Implement and Sporting Goods business at Riverdale, Neb.

FROM W. O. SESLINE, Topeka, Ind., whose stock was destroyed by fire on the 4th inst. The loss is estimated at about \$16,000, with insurance exceeding \$8000.

Mr. Sesline will resume business as soon as suitable quarters can be arranged for. His line comprised Hardware, Implements, Stoves, Paints and Oils, Bicycles, Buggies, Carriages, Wagons, &c.

DEATH OF ANTHONY DOHERTY.

ANTHONY DOHERTY, president of the Doherty Hardware Company, Baton Rouge, La., and one of the city's most prominent and influential citizens, died on the 6th inst. after an illness of several months. Born in West Feliciana Parish, on July 20, 1844, Mr. Doherty, at the age of 14 years, entered the employment of the firm of Richard Slocumb & Co., of New Orleans, and there began his career in the hardware business, which he followed with marked success. He remained with the New Orleans firm until the Civil War began, when he resigned his position and entered the services of the Confederacy, serving with distinction for four years on the battlefield.

At the close of the war he connected himself with the firm of C. H. Slocumb & Co. of New Orleans, and remained with them for three years, when he went with H. J. Mullen & Co., for whom he traveled for eight years. He next identified himself with A. Baldwin & Co., successors to Slocumb, Baldwin & Co., and was with this firm until 1883, when he moved to Baton Rouge and entered business upon his own account under the style of Doherty & Co., which continued until 1901, when the Doherty Hardware Company, Limited, was organized with Mr. Doherty as president. Mr. Doherty leaves a widow and seven children.

THE HUNT & MOTTET COMPANY, Tacoma, Wash., has let the contract for a new \$90,000 building for its use.

A JOBBER'S METHOD OF CHECKING THE PACKING OF GOODS.

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Recording Weight of Packages.

Of special interest is the method employed for checking the contents of packages of Cutlery, Revolvers and other goods that run into money, to prevent loss or theft

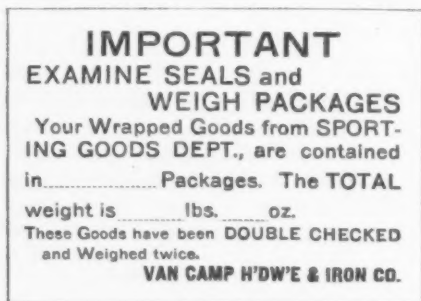


Fig. 1.—Poster Used on Packages.

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Aside from the value of the system in adjusting such matters as have been instanced, it also has an excellent moral effect, both on clerks and customers. Certainly it would tend to deter a dishonest customer from making an unjust claim if he realized that the company knew the exact weight of the goods when shipping them.

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STODDARD MFG. COMPANY, Rutland, Vt.: Booklet for distribution at State and county fairs referring to Cream Separators, Hand Testers, Butter Workers and Churns, Butter Prints, &c.

WYETH HARDWARE & MFG. COMPANY, St. Joseph, Mo.: Illustrated catalogue and price-list of fall and holiday goods.

OHIO STEEL WHEELBARROW COMPANY, Toledo, Ohio: Illustrated catalogue and price-list referring to an extensive line of Steel Wheelbarrows.

COLUMBUS BUGGY COMPANY, Columbus, Ohio: Thirty-seventh annual catalogue of Buggies, Carriages, &c.

H. B. SHERMAN MFG. COMPANY, Battle Creek, Mich.: Catalogue No. 17 illustrating and listing the company's line of Brass Pipe Fittings, &c.

E. M. DICKINSON, LIMITED, Sheffield, England: Illustrated catalogue, recently issued, referring to Pocket, Table and Butchers' Cutlery, Razors, &c. It contains a wider range of patterns than the catalogue which it supersedes, while a large number of other patterns in all classes of goods are also made.

McINTOSH HARDWARE CORPORATION, Cleveland, Ohio: Attractive catalogue illustrated in colors referring to Heather Brand Cutlery and Tools.

NEW YORK STATE HARDWARE ASSOCIATION.

THE sixth annual convention of the New York State Retail Hardware Association will be held at Buffalo, February 18-21, inclusive. In connection with the meeting there will be a Hardware exposition like the one held at Syracuse last February, but on a more extensive scale on account of the larger floor space provided. The exposition will be given in a hall having a floor space of 115 x 185 ft. The space will be laid out into booths, 116 in number, which will be rented for exhibiting Hardware. The meetings of the association will be held in a smaller hall in the same building. The exposition will be under the management of Vice-President John Holley Bradish, Batavia.

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IMPORTANT
EXAMINE SEALS and
WEIGH PACKAGES
 Your Wrapped Goods from SPORT-
 ING GOODS DEPT., are contained
 in _____ Packages. The TOTAL
 weight is _____ lbs. _____ oz.
 These Goods have been DOUBLE CHECKED
 and Weighed twice.
VAN CAMP H'DW'E & IRON CO.

Fig. 1.—Paster Used on Packages.

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CLAYTON & LAMBERT MFG. COMPANY, Detroit, Mich.: Illustrated price-list booklet referring to Gasoline Fire-pots, Torches, &c.

SMITH & POMEROY WIND MILL COMPANY, Kalamazoo, Mich.: Illustrated catalogue of Eureka Wind Mills, Towers, Tanks, Feed Grinders, Horse Powers, Wood Saws and Wind Mill Supplies.

STODDARD MFG. COMPANY, Rutland, Vt.: Booklet for distribution at State and county fairs referring to Cream Separators, Hand Testers, Butter Workers and Churns, Butter Prints, &c.

WYETH HARDWARE & MFG. COMPANY, St. Joseph, Mo.: Illustrated catalogue and price-list of fall and holiday goods.

OHIO STEEL WHEELBARROW COMPANY, Toledo, Ohio: Illustrated catalogue and price-list referring to an extensive line of Steel Wheelbarrows.

COLUMBUS BUGGY COMPANY, Columbus, Ohio: Thirty-seventh annual catalogue of Buggies, Carriages, &c.

H. B. SHERMAN MFG. COMPANY, Battle Creek, Mich.: Catalogue No. 17 illustrating and listing the company's line of Brass Pipe Fittings, &c.

E. M. DICKINSON, LIMITED, Sheffield, England: Illustrated catalogue, recently issued, referring to Pocket, Table and Butchers' Cutlery, Razors, &c. It contains a wider range of patterns than the catalogue which it supersedes, while a large number of other patterns in all classes of goods are also made.

McINTOSH HARDWARE CORPORATION, Cleveland, Ohio: Attractive catalogue illustrated in colors referring to Heather Brand Cutlery and Tools.

NEW YORK STATE HARDWARE ASSOCIATION.

THE sixth annual convention of the New York State Retail Hardware Association will be held at Buffalo, February 18-21, inclusive. In connection with the meeting there will be a Hardware exposition like the one held at Syracuse last February, but on a more extensive scale on account of the larger floor space provided. The exposition will be given in a hall having a floor space of 115 x 185 ft. The space will be laid out into booths, 116 in number, which will be rented for exhibiting Hardware. The meetings of the association will be held in a smaller hall in the same building. The exposition will be under the management of Vice-President John Holley Bradish, Batavia.

The Trades 100 Years Ago.

Ninth Article.

The following article with the accompanying illustration is taken from the "Book of Trades, or Library of the Useful Arts, which was published in 1807 by Jacob Johnson, London, and at that time for sale in his book-stores in Philadelphia and Richmond, Va.

The Tin Plate Worker.

Tin plate, or tin, as it is usually called; is a composition of iron and block tin, not melted together, but the iron in bars is cased over with tin and then flattened or drawn out by means of mills.

In the year 1681 tin plates were made in England by Andrew Yarranton, who was sent into Bohemia to learn the art. The manufacture did not seem to answer, and was even reckoned among the projects called bubbles in 1720; in a very few years it was again revived, and in the year 1740 it was



Tin Plate Worker

brought to such perfection that very small quantities have since that time been imported. Our plates are of a finer gloss or coat than those made beyond the sea, the latter being chiefly hammered, but ours are always drawn out by the rolling mill.

The tin plate worker receives it in sheets, and it is his business to form them in all the various articles that are represented in the plate, such as kettles, sauce pans, canisters of all sorts and sizes, milk pans, lanthorns, &c.

The instruments that he makes use of are a large pair of shears to cut the tin into the proper size and shape, a polished anvil and hammers of various kinds. The joints of his work he makes with solder, which is a composition of what is called block tin and lead; this he causes to unite with the tin by means of rosin.

The business of a tin plate worker is very profitable to the master, and the journey-

man, if sober and industrious, can with ease earn from 35 shillings to 2 guineas a week. The principal manufacturers in London are Jones & Taylor's, in Tottenham Courtroad, and Howard's, in Old street. These seldom employ less than 100 or 150 men each. Those who manufacture tinware on a smaller scale may be found in every part of the metropolis, and one of the chief sources of profit which these smaller tradesmen enjoy is that of lamp lighting.

This business does not require great strength, but if a man would carry it on upon a larger scale it requires a very considerable capital; journeymen's wages may amount to between 2 and 3 pounds per week. In fact, the tin plate worker pays his men twice a week, for on the Wednesday night a bell is rung which announces to each workman that the master or his chief clerk is ready in the counting house to lend money to those who cannot wait till Saturday night for their wages.

The large houses have constantly travelers in various parts of the kingdom, and, as they cannot carry the articles of their trade in saddle bags, they have drawings of all works of taste, such as molds for jellies, puddings, &c.

Tin in blocks resembles silver, but is darker. It is softer, less elastic and sonorous than any other metal except lead. It is easily extended into leaves, and melts more readily than all the metals. A composition of eight parts of bismuth, five of lead and three of tin will melt in boiling water. When tin is made pretty hot it will break with a blow. In the ore tin is mixed with arsenic.

Tin being less liable to rust than iron, copper or lead is advantageously used for the inside covering of metallic vessels. An amalgam of tin and mercury is used to cover the back surfaces of looking glasses.

The chief tin mines in the known world are those in Cornwall. It is a fact well ascertained that the Phenicians visited these islands for the purpose of getting tin some centuries before the Christian era. In the time of King John the Cornwall mines produced but little, the right of working them being at that period wholly in the King, as Earl of Cornwall. Their value has fluctuated at different periods; about a century ago they did not yield above 30,000 or 40,000 lb. per annum, but of late years they have produced five times that sum. The Prince of Wales, as Duke of Cornwall, receives 4 shillings upon every cwt. of what is called coined white tin; this amounts to about 10,000 pounds per annum. The proprietors of the soil have one-sixth, and the rest goes to the adventurers in the mine, who are at the whole charge of working.

The tin being to be divided among the lords and adventurers, is stamped and worked at the mill, and is then carried under the name of block tin to the melting house, where it is melted and poured into blocks or bars and carried to the coinage town.

The coinage towns are Leskard, Lestwithiel, Truro, Helston and Penzance, being the most convenient parts of the country for the tinnners to bring their tin to every quarter of a year.

The Hardware store of Scott & Einsel, Axtell, Neb., was recently damaged by fire to the extent of \$12,000.

George Howard's Hardware Store.*

CONCLUDING ARTICLE.

Table for Goods to Be Delivered.

Back of this section of shelving is a table on which goods to be delivered about the city are placed. The location of the table was shown in Fig. 1, and the table itself in Fig. 12. The Shelves are each $3\frac{1}{2}$ ft. wide and 7



Fig. 12.—Table for Goods to Be Delivered.

ft. long, with a distance of 16 in. between Shelves, the lower Shelf also being 16 in. above the floor.

Brush Rack.

The Brush Rack, illustrated in Fig. 13, is located on the right hand side of the rear section of shelving, as

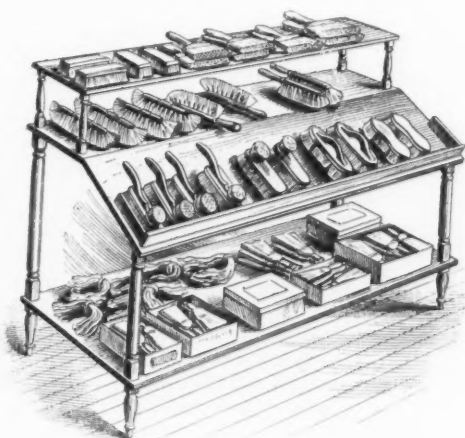


Fig. 13.—Brush Rack.

was shown in Fig. 1. The rack is 42 in. high at the back, above which is a shelf 16 in. higher. The front legs are 32 in. long and the rack is 6 ft. long. On the rack are kept Whisk Brushes, Counter Brushes, Dust Heads, Calimine Brushes, Mop Heads, &c.

Tables for Housefurnishings.

In front and back of the Brush rack are a number of tables holding Nickel Plated and Enamel Ware, Tin Ware, Kitchen Utensils, Housefurnishing Goods, &c. The tables have four shelves supported by turned spindle supports, the shelves being smaller towards the top. The top shelves are about $3\frac{1}{2}$ ft. wide and $5\frac{1}{2}$ ft. long. The distance between the shelves is from 15 to 19 in. respectively.

Bird Cage Rack.

The Bird Cage rack is located immediately under, and partially in a skylight, as shown in Fig. 14. It is made of Gas Tubing, finished in gilt bronze. It is about 6 ft. long and 40 in. wide, suspended by being chained to a

bar extending across the skylight opening and also at the four corners with heavy brass Jack Chain. The

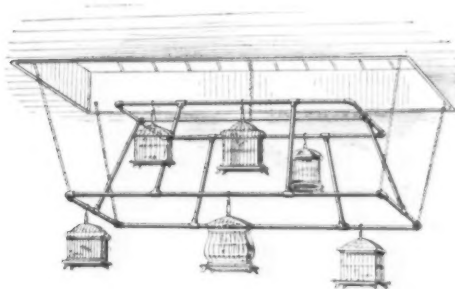


Fig. 14.—Bird Cage Rack.

strong light from above makes the rack prominent and shows off the Cages to good advantage.

Sample Bathrooms.

Immediately at the left of the left hand entrance door is the bookkeeper's and cashier's office, with buyers' desk, safe, wardrobe and typewriter. Back of this are two sample bathrooms, one of which is shown in Fig. 15. The partitions are 4 ft. high and the enclosures are 6 ft. wide and 7 ft. deep. Samples of Enameled Iron



Fig. 15.—Sample Bathrooms.

Bath Tubs, Wash Stands, Closets and Tanks are installed. Mirrors are hung on the wall, and in one of the enclosures a Bath Spray is sampled. Here persons can see the different articles installed as they would appear in their houses and thus form an excellent idea of their requirements and cost. In the rear of these enclosures Wash Trays are sampled, in front of which are Ranges and Heating Stoves, in season. Back of the Trays is a deep closet on the shelves of which are kept Warm Air Registers and Closet Hoppers.

At the rear of this side of the store is a private office, and adjoining, an office used for estimating on shop work. In this part of the building is also a stairway to the cellar.

Shops, Etc.

Back and to the left of the Bird Cage rack is a room where duplicate stock in original cases is kept. Back of this portion of the store is the receiving room and cornice shop, also stairs leading down to the plumbers' shop and up to the tin shop.

MISCELLANEOUS NOTES.

Harness Trimmings with Oxidized Copper and Nickel Finish.

The Colton Mfg. Company, Montpelier, Vt., maker of saddlery hardware, is introducing in harness trimmings the oxidized copper and nickel finish which is quite common in builders' hardware and other lines, but which, it is stated, has never been much used in connection with harness. These finishes make quite an attrac-

* This series of articles relates to the establishment of George Howard, Mount Vernon, N. Y. The other articles appeared in our issues 19th and 12th inst.

tive harness, and appear to be giving satisfaction to users.

Parabola Luminous Dial Time and Alarm Clock.

The Divine W. M. Company, Utica, N. Y., is manufacturing the Stephens' Parabola luminous dial time and alarm clock illustrated herewith, a patent on which was obtained a few months since. The clock is constructed on the principle of the reflector in a locomotive head-



Parabola Luminous Dial Time and Alarm Clock.

light, the interior of the reflector being covered with a light absorbing compound which stores the light and reflects it in the darkness. The company remarks that many luminous clocks have been made in the past, but their life has been very short, the phosphorus, the luminous property, soon burning out. The compound used by the company in the parabolic dial, it is stated, contains no phosphorus, and will last for years. One of the largest clock makers in the country furnishes the clock movement, and it is guaranteed to keep accurate time. The clock is fitted with a unique alarm, the going off of which arouses the sleeper without jarring the nerves, the sound not being an unpleasant one, while effective. The case is of attractive mission style, dead finish, the sash and dial being of aluminum. The dimensions of the clock are 7 x 7 x 5 in.

The Hoxie Expanding Bullet.

Owing to improvements in powder and firearms bullet velocities have been greatly increased, with the effect

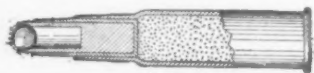


Fig. 1.—Sectional View of the Hoxie Cartridge.

that even the ordinary soft nosed bullet will often pierce the body of game without producing a mortal wound.



Fig. 2.—How a Hoxie Bullet Looks When Expanded.

The Hoxie expanding bullet, made by the Hoxie Ammunition Company, Marquette Building, Chicago, and illustrated herewith, is characterized as more humane because

of its deadly action. These bullets, which are applied to any standard cartridges without disturbing the original load, are provided with an impact ball and small air chamber inserted just back of the point, as will be noted in the sectional view of the cartridge shown in Fig. 1; this causes them to expand the instant they strike soft tissue. The result is that a smaller caliber bullet and a correspondingly light rifle can be used effectively in hunting big game, since the shock of the wound produced by expansion is generally sufficient for fatal results. Fig. 2 shows a .33-caliber Hoxie bullet taken from a hind-quarter of beef, in which it expanded as shown 6 in. below the surface. It is stated that a Hoxie bullet will expand if shot at a pumpkin, but will bore clean through a 3-16-in. steel plate. It therefore has great power of penetration and expands upon striking flesh or tissue.

Victor Belt Coupling.

Patterson, Gottfried & Hunter, 146-150 Centre street, New York, have put on the market the Victor belt coupling, here shown. The novel feature of the coupling is that each part is made of pressed steel, having deep, well cut threads, into which the round leather belting can be

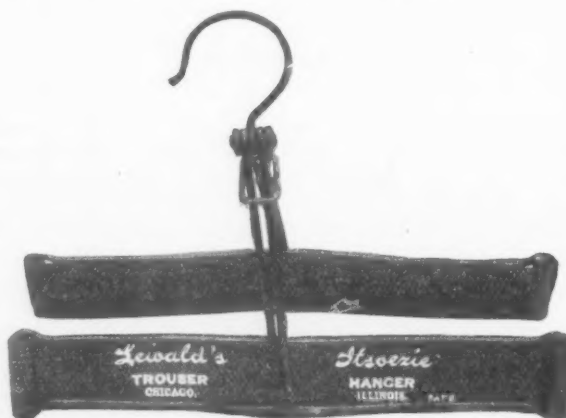


Victor Seamless Pressed Steel Belt Coupling.

screwed. From the character of the material and process of manufacture the coupling is exceptionally strong, smooth and neat, with no projecting burrs or edges to catch material or interfere with smooth running. There are 19 diameters, $\frac{1}{8}$ to $1\frac{1}{4}$ in., inclusive, increasing by thirty-seconds to $\frac{3}{8}$, by sixteenths to $\frac{1}{2}$ and by eighths to $1\frac{1}{4}$ in., blued finish.

The Itsoezie Trouser Hanger.

The trouser hanger shown herewith is one of a line of similar devices offered under the name of "Itsoezie," by F. Lewald & Co., 185-191 Adams street, Chicago. It is made of pressed steel strips highly finished in black japan. The inside surfaces of the hanger, which come in contact with the garment, are lined with cloth for the purpose of protecting the fabric and to prevent slipping.



The Itsoezie Trouser Hanger.

The other surfaces are covered with black tape, upon which advertisements printed in silver letters show with good effect. The clamping plates are attached to wires provided with sliding rings to draw them tight against the garment, which are prevented from sliding upward by ratchet notches in the contact surface of the wire. This particular hanger is designated as No. 17, and weighs 50 lb. to the gross.

Combination Machinists' Pipe Cutter Vise.

The combination machinists' pipe cutter vise here illustrated has been devised by the Pittsburgh Automatic Vise & Tool Company, Pittsburgh, Pa., and is now offered to the trade. The feature of the tool is the utilizing of the rear of the drawbar for the pipe attachment instead of the throat of the vise. Thus there is no inter-

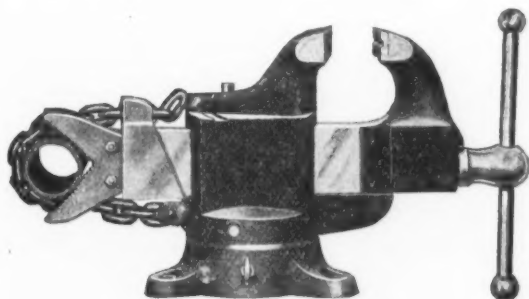


Fig. 1.—Combination Machinists' Pipe Cutter Vise.

ference with the working of the machinists' jaw. To the end of the drawbar is fitted a glovelike casting to which is attached the pipe jaws made of special mixed tool steel, hammered, forged and tempered. The jaws are placed close together. A small lug is screwed into the rear of the vise directly under the slide bar. This is slotted to permit the reception of one link of chain. When the castings are in position on the rear of the vise one end of the chain is made firm to the lug by means of a small pin shown in Fig. 2, and the pipe is placed in the jaws with the chain thrown around it, a link being dropped

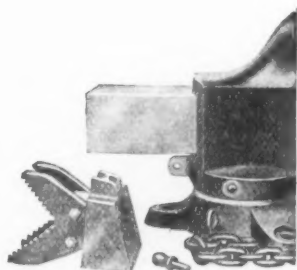


Fig. 2.—Pipe Cutter Attachment Removed.

into the lug on the top of the casting. Then with both ends of the chain held firmly, a half turn of the main screw of the vise throws the draw bar backward, drawing the chain tightly around the pipe and securely locking it against any possible rotation or movement. As all the Pittsburgh vises are automatic in movement the swivel in the base of the vise is also locked automatically when the pipe is locked. Thus if it is desired to hold the work on the outside of the bench the screw may be loosened



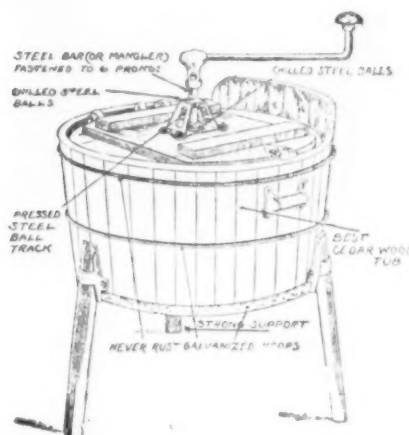
Four Pour Ladle.

and the vise swiveled around, both work and vise being locked. As the attachment does not interfere with the other jaws of the tool it can be left in place as long as wanted. If, however, it is desired to remove it, one pull of the pin and the chain is off as well as the entire attachment. It can then be placed to one side out of the way. It should be noted that a pipe can be instantly held without any opening or closing of the jaws irrespective of the position of the regular jaws. An unlimited jaw capacity is secured, as there is nothing in the way to pre-

vent making the pipe jaws any desired size. Further than this, it is possible to place the pipe in the position most advantageous for the operator. One important feature of the tool is said to be that all possibility of crushing the pipe is done away with. This is due to the use of a chain of limited tensile strength which breaks long before the danger point is reached. It is perfectly feasible to use such chain as it requires but the slightest tightening upon it gives a firm hold on the pipe.

The Prince Ball Bearing Washing Machine.

The Prince Washing Machine Company, Allentown, Pa., is offering the ball bearing washer shown herewith. The construction of the machine is largely indicated by the descriptive phrases incorporated in the cut. The support or framework is bolted securely with large bolts on each side, is galvanized to be rust proof and is fastened under the lid with large washers, thus preventing the wood from rotting around the framework. The 24 balls are made of chilled steel and rotate in two



Prince Ball Bearing Washing Machine.

circular pressed steel race tracks. The mangle bar is galvanized and securely fastened to the mangle. It slides up and down without disturbing the ball races, and is slotted at the top to receive the handle. The machine is said to wash satisfactorily lace curtains, center pieces, dainty shirt waists, &c., but will also do the heavy grades of washing, such as carpets, blankets, quilts, overalls, &c. It is described as simply constructed, light weight but strong, easy running, not liable to get out of order and calculated to do its work without tearing or ripping the clothes.

Four-Pour Ladle.

The accompanying illustration represents a ladle which has been added to the line of household utensils

made by the Cassady-Fairbank Mfg. Company, Chicago. It is made long to prevent danger of scalding the hands, its total length being 13 in., including the 5-in. ebonized wood handle. The bowl holds $\frac{1}{2}$ pint, being $3\frac{1}{2} \times 3 \times 1$ in. in size and both bowl and stem are highly nickel plated. The feature of the ladle which gives it its name is that it pours evenly without spilling however it is tipped, thus tending to obviate the necessity of using a funnel. Ladles weigh 41 lb. to the gross and are packed one dozen in a box.

Adjustable Window Screen.

The flexible window screen, designed to fit any ordinary window, herewith illustrated, of which S. U. Tarney is patentee, is manufactured by the Roller Window Screen Company, Hillsdale, Mich. Its construction in-

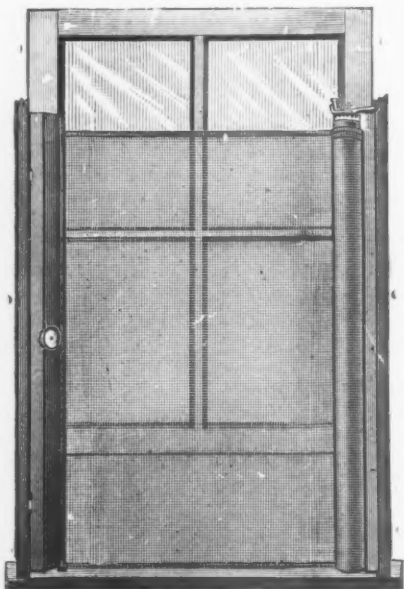


Fig. 1.—Adjustable Window Screen in Position in Window.

volves the use of a spring roller similar to that used for curtains. In one particular, however, it differs from the ordinary spring roller in that it has swelled ends, the greater part of the body having a slightly concaved form. By this means it is explained that the wire cloth in rolling up is kept tight at the upper and lower edges. Two screws in the right hand side and one in the left

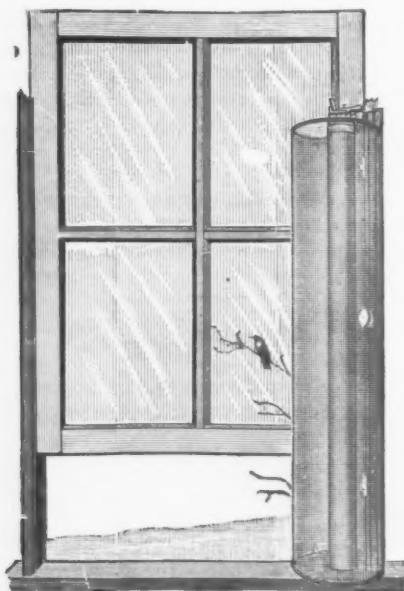
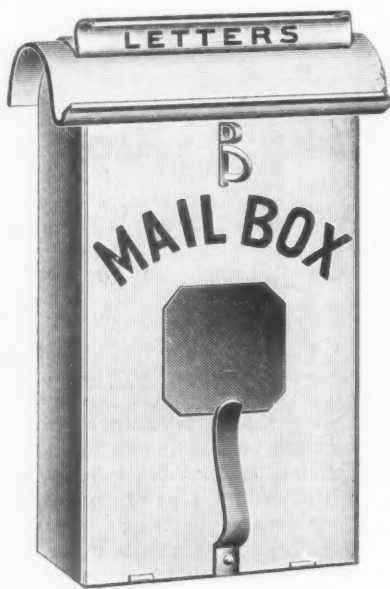


Fig. 2.—Screen Swung Round Clear of Window.

of the jambs is all that is required to secure the screen to a window, to which it may be fitted either on the inside or outside. If desired the screen may be swung round clear of the window as shown in Fig. 2. When in position the window may be raised or lowered to any height without interference, and at the end of the season the screens can be rolled in compact bundles for storage; being interchangeable they can be applied to any window indiscriminately without reference to former fitting.

Improved Twentieth Century Mail Box.

The mailing box, illustrated herewith, is designed for use of free delivery service in cities only. It is made by the Wm. F. Heise Mfg. Company, 61-63 Union Park Court, Chicago, and is durably constructed of No. 24 galvanized steel. A heavy glass panel set in the door permits the contents to be seen, and a spring clip attached to the lower edge of the box is provided for holding papers or packages of too great bulk to be inserted in the letter slot. The door is fitted with a padlock, so that the contents of the box cannot be removed without the

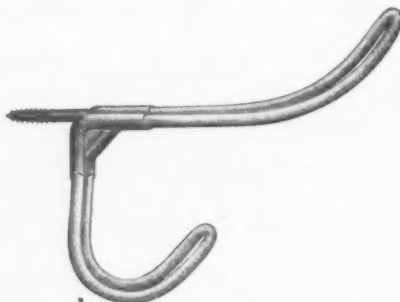


Improved 20th Century Mail Box.

key. The letter slot in the top of the box is protected by a spring hinged cover bearing the word letters, making the box rainproof. The box bears a strong resemblance to the regular United States mail boxes, and is painted with aluminum bronze, which forms an effective background for the lettering which is red. It is stated that these mail receptacles have been approved by the postal authorities. In size they are 10 in. in height, 5½ in. in width, 2¾ in. in depth, the shipping weight being 42 lb. per dozen. The company states that it does not sell to mail order houses.

Bradley Metal Clasp Hall Hook.

The hall or bathroom hook here shown is made by the Atlas Mfg. Company, New Haven, Conn. It is said to embody the principal features of the company's other coat and hat hooks, having a metal clasp in the corner which adds strength and gives a more open, roomy hook. There is a swell at the back of the lower hook which

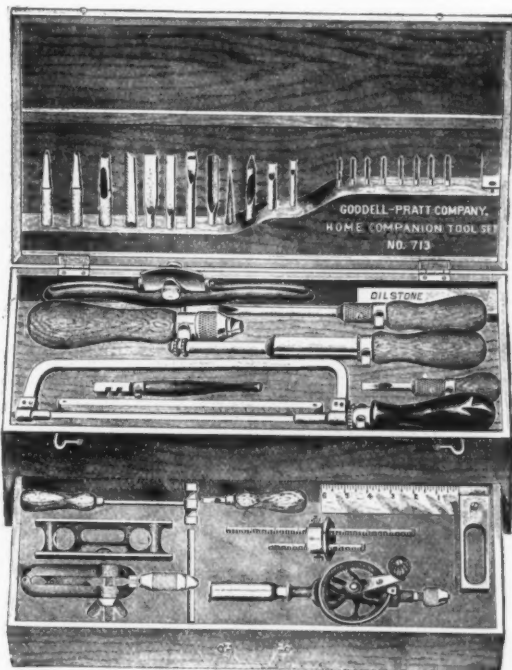


Bradley Metal Clasp Hall Hook.

prevents it from turning on the screw. The upper arm is extended out and up to afford a secure hold on hat or towel. This hook is made in the 4-in. size only and is furnished in japanned, coppered, tinned, brass or nickel plated finishes. One-quarter gross are packed in a paper box and six gross in a case.

Home Companion Tool Set, No. 713.

The Goodell-Pratt Company, Greenfield, Mass., has added to its line of Home Companion tool sets the No. 713 set shown herewith. This, the company explains, is the most complete assortment it is now putting on the market. The outfit comes in a polished hardwood case, 16 in. long, 8½ in. wide and 5½ in. deep. The tools are contained in the top as well as in a drawer as shown.

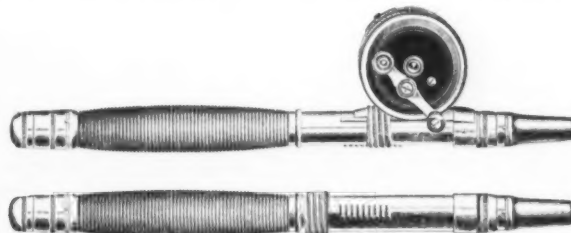


Home Companion Tool Set, No. 713.

being held in place by suitable clips. It is stated that the variety selected will enable one to do almost any odd job that could come up in the home. The price of the set is but very little above the price of the tools themselves, representing it is said a very small part of the cost of the case. The company is now offering sets in five sizes, affording a variety which it is believed will stimulate the tool trade in any locality and will be found especially adapted to holiday sales.

Locking Reel Band.

The Horton Mfg. Company, Bristol, Conn., manufacturer of Bristol steel fishing rods, rod mountings, &c., has recently patented and is now offering to the trade the locking reel band illustrated herewith. It is believed that the device will be much appreciated by fisher-



Locking Reel Band.

men, as it is simple, easily operated and self-adjusting, fitting and securely holding on any reel that can be used with the standard ¾-in. seat. The reel band is formed with a spiral recess on the inner surface which engages the lugs raised on the under side of the reel seat. These lugs are shown in the lower cut while the reel locked in position is shown above. This locking reel band can be furnished with any Bristol or Rainbow rod except when the patent finger hook is used.

Radiator Brush.

The Osborn Mfg. Company, Cleveland, Ohio, manufacturer of brooms, brushes, foundry supplies, &c., has added to its line the Radiator brush here illustrated. It comes in two lengths, 26 and 36 in. over all. The brush part is flat, about 1 in. thick, 3½ in. wide and 6 in. long, and has a twisted wire stem and enameled handle. The bristles are twisted right into the wire stem, thus giving



Radiator Brush.

it four brushing sides. It is claimed that the brush reaches every part between the sections of a radiator; also that it is very convenient for use around the house in cleaning between banisters and under bookcases and other pieces of furniture that sit close to the floor.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—

Linseed, City, raw.....	45	@16
City, Boiled.....	46	@17
State and Western, raw.....	44	@15
Raw, Calcutta, in bbls.....	70	@22
Lard, Extra Prime, Winter.....	74	@17
Extra No. 1.....	54	@15
No. 1.....	50	@13
Cotton-seed, Crude, f.o.b. mills.....	43	@14
Summer Yellow, Prime.....	46	@15
Summer White.....	49	@16
Yellow Winter.....	49	@16
Sperm, Crude.....	59	@20
Natural Winter.....	72	@23
Bleached Winter.....	75	@24
Bleached Winter, Extra.....	76	@25
Tallow, Prime.....	62	@21
Whale, Crude.....	35	@12
Natural Winter.....	48	@15
Bleached Winter.....	50	@16
Extra Bleached Winter.....	53	@17
Menhaden, Brown, Strained.....	35	@12
Light Strained.....	36	@13
Northern.....	37	@14
Southern.....	38	@15
Cocunut, Ceylon.....	84	@29
Cochin.....	84	@29
Cod, Domestic, Prime.....	36	@12
Newfoundland.....	40	@13
Red, Elaine.....	47	@15
Saponified.....	63	@21
Olive, Italian, bbls, Yellow.....	72	@23
Nutsfoot, Prime.....	52	@17
Palm, Lagos.....	63	@21

Mineral Oils—

Black, 29 gravity, 25@30 cold test.....	12	@13
29 gravity, 15 cold test.....	13	@14
Summer.....	12	@13
Cylinder, light filtered.....	19	@20
Dark, filtered.....	16	@17
Paraffine, 903-907 gravity.....	14	@14
903 gravity.....	13	@13
883 gravity.....	10	@11
Red.....	13	@14

Miscellaneous—

Barytes.....	18	@50
White, Foreign.....	18	@50
Amer. floated.....	19	@50
Off color.....	13	@16
Chalk, in bulk.....	3	@35
In bbls.....	100	@35
China Clay, Imported.....	11	@17
China Oxide.....	100	@25
Whiting, Commercial.....	100	@32
Gilders.....	100	@35
Ex. Gilders.....	100	@35
Putty, Commercial.....	100	@10
In bladders.....	1	@15
In bbls, or tubs.....	1	@15
In 1 lb to 5 lb cans.....	2	@25
In 12½ to 50 lb cans.....	1	@30
Spirits Turpentine.....	1	@15
In oil bbls.....	51	@35
In machine bbls.....	55	@35
Glue.....	12	@15
Cabinet.....	12	@15
Common Bone.....	7	@9
Extra White.....	12	@14
Foot Stock, White.....	12	@14
Foot Stock, Brown.....	9	@11
German Hide.....	12	@18
French.....	10	@10
Irish.....	13	@16
Low Grade.....	10	@12
Medium White.....	14	@17
Gum Shellac.....	36	@39
Bleached, Commercial.....	46	@48
Blue Dry.....	40	@50
Button.....	40	@50
Diamond.....	53	@55
Fine Orange.....	45	@50
A. C. Garnet.....	42	@43
G. A. L.....	35	@36
Kala Button.....	28	@29
D. C. Button.....	56	@57
Octagon.....	51	@52
T. N.....	36	@38
V. S. O.....	53	@55
Colors in Oil.....	12	@14
Black, Lampblack.....	12	@14
Blue, Chinese.....	36	@46

Blue, Prussian.....	32	@36
Blue, Ultramarine.....	15	@16
Brown, Van Dyke.....	12	@15
Green, Chrome.....	12	@16
Green, Paris.....	21	@21
Sienna, Raw.....	12	@15
Sienna, Burnt.....	12	@15
Umber, Raw.....	11	@14
Umber, Burnt.....	11	@14

White Lead, Zinc, &c.—

Lead, English white, in Oil.....	10	@10
Lead, American White.....	10	@10
Lots of 500 lb or over, in Oil.....	8	@8
Lots less than 500 lb, in Oil.....	8	@8
Lead, White, in oil, 25 lb tin.....	14	@14
Paris, add to keg price.....	14	@14
Lead, White, in oil, 1 to 5 lb.....	1	@1
Paris, add to keg price.....	14	@14
Lead, White, in oil, 1 to 5 lb.....	1	@1
Paris, add to keg price.....	14	@14
Lead, American, Terms: For lots 12 tons and over ¼¢ rebate; and 2% for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice, for lots of less than 500 lbs. net.....	5	@5
Zinc, American, dry.....	5	@5
Zinc, French.....	8	@8
Antwerp, Red Seal, dry.....	10	@10
Antwerp, Green Seal, dry.....	10	@10
Paris, Red Seal, dry.....	9	@9
Paris, Green Seal, dry.....	11	@11
Zinc, V. M. French, in Poppy Oil.....	11	@11
Green Seal.....	13	@13
Lots of 1 ton and over.....	13	@13
Lots of less than 1 ton.....	13	@13
Zinc, V. M. French, in Poppy Oil.....	11	@11
Red Seal.....	11	@11
Lots of 1 ton and over.....	11	@11
Lots of less than 1 ton.....	11	@11
Discounts—French Zinc—Discounts to buyers of 10 bbl. lots of one or mixed grades 1% 25 bbls., 2% 50 bbls., 4%.....	11	@11
Dry Colors.....	6	@6
Black Carbon.....	6	@6
Oron, American.....	3	@3
Black Drop, English.....	5	@5

Black, Ivory.....	16	@20
Lamp, commercial.....	4	@6
Blue, Celestial.....	4	@6
Blue, Chinese.....	30	@33
Blue, Prussian.....	28	@32
Blue, Ultramarine.....	3	@3
Brown, Spanish.....	1	@1
Carmine, No. 40.....	10	@10
Green, Chrome, ordinary.....	3	@3
Green, Chrome, pure.....	17	@25
Lead, Red, bbls., ½ bbls., kegs.....	6	@7
Litharge, bbls., ½ bbls., kegs.....	6	@7
Other American.....	10	@10
American Golden.....	2	@2
French.....	2	@2
Foreign Golden.....	3	@3
Orange Mineral, English.....	10	@12
French.....	10	@12
German.....	10	@12
American.....	8	@9
Red, Indian, English.....	4	@4
American.....	3	@3
Red, Turkey, English.....	4	@10
Red, Tuscan, English.....	7	@10
Red, Venetian, Amer.....	100	@25
English.....	100	@25
Sienna, Italian, Burnt and Powdered.....	3	@9
Italian, Raw Powdered.....	3	@7
American, Raw.....	14	@2
American Burnt and Powdered.....	14	@2
Tale, French.....	10	@10
American.....	10	@10
Terra Alba, French.....	100	@100
English.....	100	@100
American.....	100	@100
American.....	100	@100
Under, Trivet and Powdered.....	2	@3
Burnt, American.....	14	@2
Raw, American.....	14	@2
Yellow Chrome Pure.....	12	@14
Vermilion, American Lead.....	7	@25
Quicksilver, bulk.....	65	@65
Quicksilver, kegs.....	65	@65
English, Imported.....	65	@65
Chinese.....	65	@65

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33½ @ 33½ & 10% signifies

that the price of the goods in question ranges from 33½ per cent. discount to 33½ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1907, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—"The Iron Age Standard Hardware Lists" contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Columbian and Domestic.....33½%
Zimmernan's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....35%
Taplin's Perfection.....35%

Ammunition—

See Caps, Cartridges, Shells, &c.

Anti-Rattlers—

Fernald Mfg. Co. Burton Anti-Rattlers, ½ doz. pairs, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

Anvils—American—
Eagle Anvils.....@ 8%
Hay-Budden, Wrought.....@ 9%
Trenton.....@ 9%

Imported—

Peter Wright & Sons, ½ lb. 84 to 349 lb. 11¢; 350 to 600 lb. 11½¢.

Anvil, Vise and Drill—
Millers Falls Co., \$18.00.....10&10%

Apple Parers—See Parers, Apple, &c.

Aprons, Blacksmiths'—
Livingston Nail Co.....33½%

Augers and Bits—
Com. Double Spur.....75@80%

Jennings' Pat., Bright, 1.65 to 1.70%
Black Lip, or Blue.....60&65%

Boring Mach. Augers.....70%
Car Bits, 12-in. twist.....40&10%

Ford's Auger and Bit Co., 1 & 2 Co., Ft. Washington Auger Co., Concord's.....35%

Forster Pat. Auger Bits.....25%
C. E. Jennings & Co., No. 10 ext. lip, R. Jennings' list, 2.57 to 2.62

No. 30, R. Jennings' list.....50%
Russell's.....50&55%

L'Hommedieu Car Bits.....45%
Mayhew's Countersink Bits.....45%

Pugh's Black.....35%
Pugh's Jennings' Pattern.....35%

Snell's Auger Bits.....60%
Snell's Bell Hangers' Bits.....60%

Snell's Car Bits, 12-in. twist.....60%
Snell's King Auger Bits.....50%

Wright's Jennings' Bits.....50%

Bit Stock Drills—
See Drills, Twist.

Expansive Bits—
Clark's, No. 1, 1 & 2 doz. \$2.00
No. 2, \$1.18.....60&10%

Ford's, Clark's Pattern.....65&65%
C. E. Jennings & Co., 1 & 2 doz. \$2.00
Lavigne Pat., small size, \$18.00; large size, \$26.00.....60&10%

Swan's.....60%

Cimlet Bits—
Per gro.
Common Dble. Cut.....\$3.00@3.25

German Pattern, Nos. 1 to 10, \$1.75; 11 to 13, \$5.75

Hollow Augers—
Bonney Pat., per doz. \$6.50@7.00

Atlas.....20&10%
Universal.....20%

Ship Augers and Bits—
Slip Augers.....60&10%

Ford's.....33½&65%
C. E. Jennings & Co., L'Hommedieu's.....67%

Watrous'.....33½&71%
Snell's.....40%

Awl Hafts—See Handles, Mechanics' Tool.

Awls—
Brad Awls:
Handled.....gro. \$2.75@3.00

Unhdded, Shldered.....gro. \$3.00@3.25
Unhanded, Patent.....gro. \$3.00@3.25

Peg Awls:
Unhanded, Patent.....gro. \$1.00@1.25

Unhdded, Shldered.....gro. \$1.00@1.25

Scratch Awls:
Handled, Com.....gro. \$3.50@4.00

Handled, Socket.....gro. \$1.50@1.75

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—
Single Bit, base weights: Per doz.
First Quality.....\$1.75@5.00

Second Quality.....\$1.25@1.50

Double Bit, base weights:
First Quality.....\$1.00@1.75
Second Quality.....\$0.50@1.25

Axle Grease—
See Grease, Axle

Axles—
Iron or Steel

Concord, Loose Collar.....4½@5¢

Concord, Solid Collar.....4½@5¢

No. 1 Common, Loose.....4½@5¢

No. 1½ Com., New Style.....4½@5¢

No. 2 Solid Collar.....4½@5¢

Half Patent.....4½@5¢

Nos. 7, 8, 11 and 12.....6½@65%

Nos. 13 to 14.....6½@65%

Nos. 15 to 18.....6½@65%

Nos. 19 to 22.....6½@65%

Boxes, Axle—
Common and Concord, not turned lb. 3¢@6¢

Common and Concord, turned lb. 6¢@7¢

Half Patent.....lb. 9½¢@10¢

Bait—
Fishing—
Hendryx.....20%
A Bait.....25%
B Bait.....25%
Competitor Bait.....20&5%

Balances—
Sash—
Caldwell new list.....50%
Fullman.....50&10@60%

Spring—
Spring Balances.....50&10@60%

Chatillon's:
Light Sps. Balances.....50&50@10%

Straight Balances.....40&10@10%

Circular Balances.....50&10%

Large Dial.....30%

Barb Wire—See Wire, Barb.

Bars—
Crow—
Steel Crowbars, 10 to 40 lb. per lb. 2½¢@3¢

No. 10 Ideal, Nickel Plate.....\$9.50

Beams, Scale—
Ecale Beams.....40%

Chatillon's No. 1.....30%

Chatillon's No. 2.....40%

Beaters, Carpet—
Holt-Lyon Co., No. 12 Wire Coppered ½ doz. \$0.80; Tinned.....\$0.85

No. 11 Wire Coppered ½ doz. \$1.15; Tinned.....\$1.20

No. 10 Wire Tinned.....½ doz. \$1.50

Beaters, Egg—
Holt-Lyon Co., No. 5, Jap'd, \$0.80; No. 4, Jap'd, \$1.15; No. 6, Jap'd, \$1.85; No. 8, Jap'd, \$1.85, No. 2, \$1.35.

Taplin Mfg. Co., Improved Dover, per gro. No. 60, \$0.00; No. 75 \$0.50; No. 100, \$7.00; No. 102, Tin'd, \$8.50; No. 150, Hotel, \$15.00; No. 152, Hotel, Tin'd, \$17.00; No. 200, Tumbler, \$8.50; No. 202, Tumbler, Tin'd, \$9.50; No. 300, Mammoth, per doz., \$25.00.

Tanner & Seymour Mfg. Co., T. & S. Dover.....\$6.50

Bellows—
Blacksmith, Standard List.
Split Leather.....60&10@65%
Grain Leather.....50@50&10%

Hand—
Inch. 6 7 8 9 10
Doz. \$5.00 5.50 6.00 6.50 7.50

Molders—
Inch. 10 12 14 16
Doz. \$7.50 9.00 12.00 15.00

Bells—
Cow—
Ordinary Goods.....75&5@75&10&5%
High grade.....70&10@75%

Jersey.....75&10%
Texas Star.....50%

Door—
Home, R. & E. Mfg. Co.'s.....35&10%

Hand—

Polished, Brass.....50@50&10%

Waste Metal.....50@50&10%

Nickel Plated.....50%

Swiss.....50%

Cone's Globe Hand Bells.....50%

Miscellaneous—

Farm Bells.....lb. 2½¢@2½¢

Church and School.....60&10@65%

Belting—

Extra Heavy, Short Lap.....60&5%

Regular Short Lap.....60&10&5%

Standard.....70&5%

Light Standard.....75%

Cut Leather Lacing.....40&5%

Leather Lacing Staps, per sq. ft. 25¢

Rubber—

Agricultural (Low Grade).....75&10@75&10%

Common Standard.....70&10@70&10%

Standard.....70&10@70&10%

Extra.....60&5@60&10%

High Grade.....50&5@50&10%

Bench Stops—

See Stops, Bench

Benders and Upsetters, Tire—
Green River Tire Benders and Upsetters.....20%

Bicycle Goods—
John S. Leung's Son & Co.'s 1907 list:
Chain, Parts, Spokes.....50%

Hendryx Bronze; Series 700, 800, 300.
Hendryx Enamelled.....35

Calipers—See Compasses.**Calks, Toe and Heel—**

Blunt, 1 prong, per lb., 4 1/2 @ 4 3/4¢
Sharp, 1 prong, per lb., 4 1/2 @ 4 3/4¢
Blunt, 2 prongs, per lb., 4 1/2 @ 4 3/4¢
Sharp, 2 prongs, per lb., 4 1/2 @ 4 3/4¢
Latent, Blunt, 4 prongs, per lb., 4 1/2 @ 4 3/4¢
Peterson, Blunt, 4 prongs, per lb., 4 1/2 @ 4 3/4¢

Can Openers—

See Openers, Can.

Caps, Percussion—

Eley's E. B. 58¢ @ 55¢
E. D. per M 34¢ @ 35¢
F. L. per M 40¢ @ 42¢
G. E. per M 40¢ @ 42¢
Musket per M 62¢ @ 65¢

Primers—

Berdan Primers, 2¢ per M. 20¢ @ 25¢
Primer Shells and Bullets. 15¢ @ 10¢
All other primers per M. \$1.50 @ 1.60

Carpet Stretchers—

See Stretchers, Carpet.

Cartridges—

Blank Cartridges:
32 C. F., \$5.50. 10¢ @ 5¢
32 C. F., \$1.00. 10¢ @ 5¢
22 cal., Rem., \$1.50. 10¢ @ 5¢
32 cal., Rem., \$1.75. 10¢ @ 5¢
B. B. Caps, C&B, Bull., Steyd. \$1.50
B. B. Caps, Round Bull. \$1.40
Central Fire. 25¢
Target and Sporting Rifle. 15¢ @ 5¢
Primer Shells and Bullets. 15¢ @ 10¢
Rim Fire, Sporting. 50¢
Rim Fire, Military. 15¢ @ 5¢

Casters—

Bed 65¢ @ 10¢
Plate 65¢ @ 10¢
Pittsburgh 70¢ @ 10¢
Acme Ball Bearing 70¢ @ 10¢
Gem (Horse) Bearing 70¢ @ 10¢
Steel Gem 20¢
Standard (Horse) Bearing 40¢ @ 10¢
Yale (Double Wheel) low list. 40¢ @ 10¢

Cattle Leaders—

See Leaders, Cattle.

Chain, Proof Coil—

American Coil, Straight Link:
3-16 1/4 5-16 7-16 1/2 9-16
\$8.77 6.17 4.02 4.57 4.37 4.27 4.22
3/8 1/2 5/8 3/4 1 1 1/4 1 1/2 1 3/4 inch.
\$4.17 4.07 4.02 4.12 4.12
In cask lots, deduct 25¢.
German Coil:
6-0 to 1. 70¢ @ 10¢
2 and 3. 60¢ @ 10¢
4, 5 and 6. 50¢ @ 10¢

Halter—

Halter Chains. 60¢ @ 10¢
German Pattern Halter Chains.
List July 24, 97. 60¢ @ 10¢
Covert Mfg. Co. 35¢ @ 5¢

Cow Ties—

See Halters and Ties.

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
6 1/2-6 3/4, Straight, with ring. \$28.00
6 1/2-6 3/4, Straight, with ring. \$29.00
6 1/2-6 3/4, Straight, with ring. \$30.00
6 1/2-6 3/4, Straight, with ring. \$31.00
NOTE—Add 2¢ per pair for Hooks.
Twist Traces, add per pair for Nos. 3 and 3, 2¢; No. 1, 3¢; No. 4, 4¢ to price of Straight Link.

Eastern Standard Traces, Wagon Chain, &c. 60¢

Miscellaneous—

Jack Chain, list July 10, '95:
Iron 60¢ @ 10¢
Brass 50¢ @ 10¢
Safety and Plumbers' Chain. 60¢ @ 10¢
Gal. Pump Chain. 10 1/2 @ 4 1/2¢
Covert Mfg. Co.:
Brace, Halter, Heel, Rein, Stallion Community. 40¢
American Halt. r. Dog and Kennel Chain. 35¢ @ 2 1/2¢ @ 40¢
Niagara Dog Leads and Kennel Chain. 40¢ @ 5¢
Wire Goods Co.:
Dog Chain. 70¢
Universal Dog-joined Chain. 50¢

Chain and Ribbon, Sash—

Oneida Community:
Steel Chain. 60¢
Fullman:
Bronze Chain, 60%; Steel Chain. 60¢ @ 10¢
Sash Chain Attachments, per set. \$4
Aluminum Sash Ribbon, per 100 ft. \$1.25 @ 30¢
Sash Ribbon Attachments, per set. \$4

Chalk—(From Jobbers.)

Carpenters' Blue. gro., 50¢ @ 55¢
Carpenters' Red. gro., 45¢ @ 50¢
Carpenters' White. gro., 40¢ @ 45¢

Checks, Door—

Barclay's 45¢
Fullman, per gro. \$5.00
Russwin 35¢ @ 40¢

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools. 50¢
Youths' Chests, with Tools. 25¢
Gentlemen's Chests, w. 3 Tools. 25¢
Farmers', Carpenters', etc., Chests, with Tools. 2 1/2¢
Machinists' and Pipe Fitters' Chests, Empty. 45¢
Tool Cabinets. 45¢
C. L. Jones & Co.'s Machine Tool Chests. 75¢

Chisels—

Socket Framing and Firmer

Standard List. 70¢ @ 10¢
Buck Bros. 70¢ @ 10¢
C. E. Jennings & Co.:
Socket Framing No. 15. 25¢ @ 7 1/2¢
Socket Framing No. 15. 25¢ @ 7 1/2¢
Swan's 60¢ @ 70¢
L. & I. J. White Co. 30¢ @ 30¢

Tanged—

Tanged Firmer. 30¢ @ 30¢
Buck Bros. 30¢ @ 30¢
C. E. Jennings & Co. Nos. 191, 181, 257
L. & I. J. White Co. 25¢ @ 5¢

Cold—

Cold Chisels, good quality. 13¢ @ 15¢
Cold Chisels, fair quality. 11¢ @ 12¢
Cold Chisels, ordinary. 9¢ @ 10¢

Chucks—

Almond Drill Chucks. 35¢
Almond Turret Six-Tool Chuck. 40¢
Beach Lat. 30¢ @ 30¢
Empire 25¢
Blacksmiths' 25¢
Jacobs' Drill Chucks. 25¢
Frat's Positive Drive. 25¢
Schnorr Patent Chucks:
Independent Lathe Chucks. 35¢
Universal, Reversible Jaws. 35¢
Combination, Reversible Jaws. 35¢
Drill Chucks, New Model, 25¢
Standard, 15¢; Slender Pat. 25¢
Positive Drive. 10¢
Planer Chucks. 20¢
Face Plate Chucks. 35¢
Standard Tool Co.:
Improved Drill Chuck. 45¢
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 17. 40¢; No. 21. 35¢
Scroll Combination, Nos. 83 and 84. 30¢
Geared Scroll, Nos. 33, 34 and 35. 35¢
Independent Iron, Nos. 18 and 318. 35¢
Independent Steel, No. 61. 25¢
Union Drill, Nos. 000, 00, 100, 101, 102, 103, 104. 35¢
Union Car Drill. 25¢
Universal, 11, 12, 15, 17, 13, 14, 15. 40¢
Universal, No. 42. 35¢
Iron Face Plate Jaws, Nos. 28, 30, 48 and 50. 35¢
Steel Face Plate Jaws, Nos. 70 and 72. 30¢
Westcott Patent Chucks:
Lathe Chucks. 50¢
Little Giant Auxiliary Drill. 50¢
Little Giant Double Grip Drill. 50¢
Little Giant Drill, Improved. 50¢
Oneida Drill. 50¢
Scroll Combination Lathe. 50¢

Clamps—

Adjustable Hammers. 20¢ @ 20¢
Carriage Makers. P. S. & W. Co. 50¢ @ 10¢
Resly, Parallel. 35¢ @ 10¢
Myers' Hay Rack. 45¢
Linsman's Swedish Nevertum. 45¢
Wood Workers' Hammers. 10¢ @ 10¢
Saw Clamps, see Vises, Saw Filers.

Cleaners, Drain—

Iwan's Champion, Adjustable. 50¢
Iwan's Champion, Stationary. 40¢

Sidewalk—

Star Socket, All Steel, 1/2 doz. \$4.05 net
Star Shank, All Steel, 1/2 doz. \$3.21 net
W. & C. Shank, All Steel, 1/2 doz. 7 1/2 in., \$3.00; 8 in., \$3.25.

Cleavers, Butchers'—

Foster Bros. 30¢
Fayette R. Plumb. 30¢
L. & I. J. White Co. 30¢

Clippers, Horse and Sheep—

Chicago Flexible Shaft Company:
1902 Chicago Horse, each. \$10.75
20th Century Horse, each. \$5.00
Lightning Belt Horse, each \$13.00
Chicago Belt Horse, each \$20.00
Stewart's Enclosed Gear Horse, each. \$4.75
Stewart's Patent Sheep Shear. \$12.75
Stewart Enclosed Gear Shear. \$9.75
Ing Machie, No. 8, each. \$9.75

Clips, Axle—

Regular Styles, list July 1, '05, 80¢ @ 90¢ @ 10¢

Cloth and Netting, Wire—

—See Wire, &c.

Cocks Dress—

Hardware list:
Plain Bibbs, Globe, Kerosene, Racking, Liquor, Rattling, &c. 60¢ @ 10¢ @ 70¢
Compression Bibbs. 55¢ @ 10¢ @ 60¢

Coffee Mills—

See Mills, Coffee.

Collars, Dog—

Nickel Chain, Walter B. Stevens & Son's list. 40¢
Leather, Walter B. Stevens & Son's list. 40¢

Compasses, Dividers, &c.

Ordinary Goods. 70¢ @ 10¢ @ 75¢
Wm. Schollhorn Co.:
Excelsior Dividers. 60¢
Lodi Dividers. 70¢ @ 10¢

Conductor Pipe,—

L. C. L. to Dealers:

Gale.	Galvanized Steel.	Charcoal Iron.	Copper.
1 1/2, 2, 3, 4, 6, 8	50¢ @ 17 1/2¢	30¢ @ 10¢	

Eastern: 70% 50¢ @ 17 1/2¢ 30¢ @ 10¢
Central: 70% 50¢ @ 17 1/2¢ 30¢ @ 10¢
Western and Southern: 70% 55¢ @ 5¢ 30¢ @ 10¢
S. Western: 65¢ @ 5¢ 30¢ @ 10¢

Terms, 60 days; 2% cash 10 days. Factory shipments generally delivered. See also Eave Troughs.

Coolers, Water—

L. & G. Mfg. Co.:
Galvanized ea. \$1.85 \$2.00 \$2.25 \$2.50 \$3.00
Galvanized, Lined, side handles, Gal. 2 3 4 6 8
Each \$1.95 \$2.15 \$2.40 \$3.30 \$4.15
White Enamelled. 10¢
Agate Lined. 10¢

Coopers' Tools—

See Tools, Coopers'.

Coppers' Soldering—

Soldering Coppers, 3 lbs. to pair and heavier, 30¢ @ 35¢; lighter than 3 lb. to pair. 32¢ @ 35¢

Cord—

Braided, Drab. lb. 35¢
Braided, White, Cam., Nos. 8 to 12, 26¢; No. 7, 26 1/2¢; No. 6, 27 1/2¢.
Cable, Laid Italian, lb., No. 18. 47¢
Italian, lb., A. No. 18, 25¢; B. 22¢
Common India. lb., 16¢ @ 11¢
Cotton Sash Cord, Twisted 18¢ @ 20¢
Patent Russia. lb., 20¢
Cable Laid Russia. lb., 21¢
India Hemp, B'd'd. lb., 21¢
India Hemp, Twisted, lb. 13¢ @ 14¢
Patent India, Twisted. lb., 17¢
Pearl Braided Cotton No. 6, 10, 12, 27 1/2¢; No. 7, 26 1/2¢; Nos. 8 to 12, 26¢
Edystone, Braided, Nos. 8 to 12, 26¢; 7, 26 1/2¢; 6, 27 1/2¢.
Harmony Cable Laid Italian, Nos. 7 Fullman. lb. 23¢
Wire Sash Cord. 18¢
Sash Cord Attachments, per doz. 10¢
Samson, Nos. 8 to 12: Braided, 1/2 lb., Drab Cotton. 50¢; Italian Hemp. 10¢ @ 20¢
50¢; Lined, 60¢; White Cotton. 50¢; Spat Cord. 50¢
Massachusetts, White. lb. 40¢
Massachusetts, Drab. lb. 45¢
Phoenix, White, Nos. 8 to 12, 27¢; Silver Lake, per lb.:
A. Drab, 40¢; A. White, 40¢; B. Drab, 40¢; B. White, 35¢; Italian Hemp, 40¢; Lined. 37 1/2¢
See also Chain and Ribbon.

Cord—

Braided, Drab. lb. 35¢
Braided, White, Cam., Nos. 8 to 12, 26¢; No. 7, 26 1/2¢; No. 6, 27 1/2¢.

Cable, Laid Italian, lb., No. 18. 47¢

Italian, lb., A. No. 18, 25¢; B. 22¢

Common India. lb., 16¢ @ 11¢

Cotton Sash Cord, Twisted 18¢ @ 20¢

Patent Russia. lb., 20¢

Cable Laid Russia. lb., 21¢

India Hemp, B'd'd. lb., 21¢

India Hemp, Twisted, lb. 13¢ @ 14¢

Patent India, Twisted. lb., 17¢

Pearl Braided Cotton No. 6, 10, 12, 27 1/2¢; No. 7, 26 1/2¢; Nos. 8 to 12, 26¢

Edystone, Braided, Nos. 8 to 12, 26¢; 7, 26 1/2¢; 6, 27 1/2¢.

Harmony Cable Laid Italian, Nos. 7 Fullman. lb. 23¢

Wire Sash Cord. 18¢

Sash Cord Attachments, per doz. 10¢

Samson, Nos. 8 to 12:

Braided, 1/2 lb., Drab Cotton. 50¢; Italian Hemp. 10¢ @ 20¢

50¢; Lined, 60¢; White Cotton. 50¢; Spat Cord. 50¢

Massachusetts, White. lb. 40¢

Massachusetts, Drab. lb. 45¢

Phoenix, White, Nos. 8 to 12, 27¢; Silver Lake, per lb.:

A. Drab, 40¢; A. White, 40¢; B. Drab, 40¢; B. White, 35¢; Italian Hemp, 40¢; Lined. 37 1/2¢

See also Chain and Ribbon.

Wire, Picture—

List July 10, 1906. 90¢ @ 10¢
Hendryx Standard Wire Picture Cord. 85¢ @ 10¢

Turner & Stanton Co. Wire Picture Cord

..... 25¢ @ 10¢

Cradles—

Grain 40¢ @ 12 1/2¢

Crays—

White Round Crays, Cases, 100 gro., \$6.50 @ \$7.50 at factory, but lower prices made by jobbers

Zelbiker's Lumber. 70¢ gro.

White and Purple, Indelible. \$7.50

Blue, Red, Green, Yellow and Terra Cotta, \$6.50; Black. \$1.00

Light Lumber, 5 1/2 in. x 15 1/2 in. round, all colors, \$16.25; Indelibles. \$18.75

Genuine Soapstone, Metal Workers', 5 in. x 1 1/2 in. Round. \$2.50; 5 in. x 1 1/2 in. Square. \$1.75; 5 x 1 1/2 x 3 1/2. \$2.50; 5 x 1 1/2 x 3 1/2. \$3.00

Crooks, Shepherds'—

Fort Madison, per doz., Heavy. \$5.50; Light. \$5.00

Crow Bars—See Bars, Crow.**Cultivators—**

Victor Garden. 50¢

Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1817, 1/2 doz. \$3.50

Star, Eagle, Rogers & Hamilton

and Anchor. 1/2 doz. \$3.00

Wm. Rogers & Son. 1/2 doz. \$2.50

Cutters—

H. H. Mayhew Co. 40¢

Red Devil. 40¢

B. Mfg. Co. 40¢

Woodward. 50¢

Meat and Food—

American. 30¢

Nos. 401 402 403 404 405 406 407

Each. \$5 \$7 \$10 \$12 \$25 \$50 \$60

Enterprise:
Nos. 5 10 12 22 32

Each. \$2 \$3 \$2.75 \$1.50 \$6 25¢ @ 7 1/2¢

No. 202. \$1.50

P. S. & W. Co.:
Dixon's. 1/2 doz. 33 1/2¢

Nos. 1 2 3 4

Ideal. \$11.00 \$17.00 \$19.00 \$20.00

Hales. 10¢ @ 10¢ @ 5¢

Lite Grit. 1/2 doz. 40¢ @ 50¢

Nos. 300 310 312 320 322

Each. \$15.00 \$18.00 \$14.00 \$72.00 \$68.00

New Triumph No. 605. 1/2 doz. \$24.00

Russwin Food, No. 1, \$24.00; No. 2. \$27.00

Enterprise Beef Shavers. 25¢ @ 30¢

Slaw and Kraut—

Henry Disston & Sons:
Slaw and Kraut Cutters. 35¢
Corn Graters. 30¢
J. M. Mast Mfg. Co.:
Slaw Cutters. 1 Knife. 1/2 doz. \$3.00
Combined Slaw Cutter and Corn Grater. 1/2 doz. \$1.00

Tobacco—

All Iron, Cheap. doz. \$1.25 @ \$1.50
Enterprise. 30¢ @ 30¢
National, 1/2 doz., No. 1, \$21; No. 2, \$18. 10¢

Diggers, Post Hole, &c.—

Disston's:
Rapid, 1/2 doz., \$21.00. 25¢
Samson, 1/2 doz., \$34.00. 25¢
Iwan's Improved Post Hole Auger. 40¢
Vaughan Pattern Post Hole Auger. 1/2 doz., \$7.00
Perfection Post Hole Diggers. 1/2 doz., \$8.75
Split Handle Post Hole Diggers. 1/2 doz., \$7.75
Hercules Pattern, 1/2 doz. \$10.00
Kohler's, 1/2 doz., Universal. \$15.00
Little Giant, 1/2 doz., Hercules. \$10.00; Invincible, \$9.00; Rival. \$8.50; Pioneer. \$7.50
Never-Break Post Hole Diggers, 1/2 doz., \$24.00. 60¢

Dividers—See Compasses.**Drawing Knives—**

See Knives, Drawing.

Dressers, Emery Wheel—

Sterling Emery Wheel Dressers. 35¢
Sterling Wheel Dresser Cutters. 35¢

Drills and Drill Stocks—

D. & H. Scovill..... 27 1/2
Ann. Fork & Hoe Co. (Scovill Pat-
tern) 60

Handled—

NOTE—Manufacturers are selling from the last of September 1, 1907, but many jobs are still using list of August 1, 1907, or selling at net prices.

Cronk's Weeding, No. 1, \$2.00; No. 2, \$2.50
Star Double Bit..... \$3.20
Ft. Madison Cotton Hoe..... \$4.00
Ft. Madison Crescent Cultivator Hoe..... \$4.00
Ft. Madison Mottlock Hoe..... \$4.00
Regular Weight..... \$4.00
Ft. Madison Sprouting Hoe..... \$4.00
Ft. Madison Dixie Tobacco Hoe..... \$4.00
Kretzinger's Cut Easy..... \$4.00
Warren Hoe..... \$4.00
B. B. 6 in. Cultivator Hoe..... \$4.00
B. B. 6 in. Hoe..... \$4.00
W. & C. Lining Shovel Hoe..... \$4.00

Hoisting Apparatus—
See Machines, Hoisting.**Holders—Bit—**

Angular, 1/2 doz. \$24.00..... 45¢10
Bardsley's, Iron, 40%; Brass and
Bronze..... 50
Knob..... 50
Pullman Mfg. Co., No. 117, Ever-
ready, 40%; Nos. 118, 119, Super-
ior..... 33 1/2

File and Tool—

Nicholson File Holders and File
Handles..... 33 1/2

Fruit Jar—

Triumph Fruit Jar Holder, 1/2 gross,
\$10.80; 1/2 doz..... \$1.25

Trace and Rein—

Fernald Double Trace Holder, 1/2 doz.
pairs..... \$1.25
Dash Rein Holder, 1/2 doz. pairs..... \$1.25

Hones—Razor—

Pike Mfg. Co., Belgian and Swaty,
50%; German..... 33 1/2

Hooks—Cast Iron—

Bird Cage, Reading..... 40
Clothes Line, Reading List..... 40
Coat and Hat, Reading..... 40
Coat and Hat, Wrightsville..... 60
Harness, Reading List..... 40

Wire—

Bell..... 80
Wire C. & H. Hooks..... 75
Bradley Metal Clasp Wire, Coat and
Hat, 70¢10; Ceiling..... 70
Columbian Hdw. Co., Gem..... 70
Parker Wire Goods Co., King..... 70
Acme, 60¢10; Chief, 70%; Crown,
75%; Czar, 65%; V. Brace, 75%;
Czar Harness, 50¢10.

Wrought Iron—

Box, 6 in., per doz., \$1.00; 8 in.,
\$1.25; 10 in., \$1.50.
Cotton..... doz. \$1.05@1.25
Wrought Staples, Hooks, &c.—
See Wrought Goods

Miscellaneous—

Hooks, Bench, see Staps, Bench.
Brush, Light, doz., \$6.20; Medium,
\$6.75; Heavy, \$7.65
Grass, best, all sizes, per doz. \$3.00
Grass, common grades, all sizes,
per doz..... \$1.75
Whiffletree..... lb. 5¢@6¢
Hooks and Eyes:
Brass..... 60¢10@10¢
Malleable Iron..... 70¢10@10¢
Cover, Mfg. Co. Gate and Scuttle
Hooks..... 40¢
Ft. Madison Cut-Easy Corn Hooks,
1/2 doz. \$3.25 to 1
Turner & Stanton's Q. Cap and
Shoulder..... 80¢10
Bench L. 3—see Bench Staps.
Corn Hooks—see Knives, Corn.

Horse Nails—

See Nails, Horse.

Horsehoes—

See Shoes, Horse.

Hose, Rubber—

Garden Hose, 1/2-inch:
Competition..... ft. 5 @ 6¢
3-ply Guaranteed..... ft. 8 @ 9¢
4-ply Guaranteed..... ft. 10 @ 11¢
Cotton Garden, 1/2-in., coupled:
Low Grade..... ft. 8 @ 9¢
Fair Quality..... ft. 10 @ 11¢

Irons—Sad—

From 4 to 10..... lb. 3 @ 3 1/2¢
B. B. Sad Irons..... lb. 3 1/2 @ 3 1/4¢
Mrs. Potts', cents per set:
No. 50 55 60 65
Jap'd Tops..... 83 80 93 91
Tin'd Tops..... 83 85 98 95
New England Pressing, lb. 3¢@4¢

Bar and Corner—

Richards Mfg. Co., Bar, 60¢10%;
Corner..... 60

Pinking—

Pinking Irons..... doz. 80¢

Irons, Soldering

See Copers.

Jacks, Wagon—

Covert Mfg. Co.:
Auto Screw..... 30¢2%; Steel, 45¢
Lockport..... 50

Lane's Steel..... 30¢5
Richards Tiger Steel, No. 100..... 30¢10
Smith & Hemenway Co.'s..... 25

Ladder—

Richards Mfg. Co., Ladder Jacks..... 50

Kettles—

Grass, Spun, Plain..... 20¢125
Enamelled and Cast Iron—See Ware,
Hollow.

Knives—

Butcher, Kitchen, &c.—
Foster Bros., Butcher, &c..... 30
Wilkinson Shear & Cutlery Co..... 60

Corn—

Columbian Cutlery Co., Wheat
Brand Knives and Hooks..... 60
Wilmington Acme, 1/2 doz., \$2.60;
Dent, \$2.75; Adj., Serrated, \$2.20;
Serrated, \$2.10; Yankee No. 1, \$1.50;
Yankee No. 2, \$1.15.

Drawing—

Standard List..... 55¢5@75¢10
C. E. Jennings & Co., Nos. 45, 46,
47..... 55¢7 1/2
Jennings & Griffin, Nos. 41, 42,
43..... 60¢8 1/2
Swan's..... 60¢8 1/2
Watrous..... 16
L. & I. J. White..... 20¢8 1/2

Hay and Straw—

Serrated Edge, per doz., \$3.50@5.75
Iwan's Sickle Edge..... doz. \$9.50
Iwan's Serrated..... doz. \$10.00

Miscellaneous—

Farmers'..... doz. \$3.00@3.25
Wostenholm's..... doz. \$3.00@3.25

Knobs—

Base, 2 1/2 inch, Birch, or Maple,
Rubber Tip..... gro. \$1.25@1.40
Carriage, Jap., all sizes..... gro. 40¢45¢

Door, Mineral..... doz. 65¢70¢
Door, Por. Jap'd..... doz. 70¢75¢
Door, Por. Nickel..... doz. 85¢90¢
Bardsley's Wood Door, Shutters, &c..... 15

Lacing, Leather—

See Belting, Leather.

Ladders, Store, &c.—

Allith Mfg. Co., Reliable..... 50
Lane's Store..... 25
Myers' Noiseless Store Ladders..... 45
Richards Mfg. Co.:
Improved Noiseless, No. 112..... 50
Climax Shelf, No. 113..... 50
Trolley, No. 109..... 50

Ladies, Melting—

L. & G. Mfg. Co. (low list)..... 20
P. S. & W..... 40
Reading..... 60

Lanterns—Tubular—

Regular, No. 9..... doz. \$4.35@4.50
Side Lift, No. 9..... doz. \$4.60@4.75
Hinge Globe, No. 9..... doz. \$4.60@4.75
Other Styles..... 40¢45¢10

Bull's Eye Police—

3-inch..... \$4.25@4.50

Latches—Thumb—

Roggin's Latches, with screw..... doz. 55¢40¢

Door—

Allith Mfg. Co., Reliable and Allegator,
50%; Reliable Cold Storage, 50%
Cronk & Carrier Mfg. Co., No. 101,
50%
Richards' Bull Dog, Heavy, No. 125,
50%
Richards' Trump, No. 127..... \$1.50

Leaders, Cattle—

Small..... doz. 50¢; large, 60¢
Covert Mfg. Co.:
Cotton, 45%; Hemp, 45%; Jute, 35%;
Sisal, 20.

Leathers, Pump—

See Pumps.

Lifters, Transom—

R. & E..... 10%

Lines—

Wire Clothes, Nos. 18 19 20
104 feet..... \$2.50 2.25 2.00
75 feet..... \$1.75 1.55 1.10

Samson Cordage Works:

Solid Braided Chalk, Nos. 0 to 3, 40%
Silver Braided Masons'..... 30
Silver Lanes Braided Chalk, No. 0,
\$6.00; No. 1, \$6.50; No. 2, \$7.00; No. 3,
\$7.50..... \$7.50
Masons' Lines, Shade Cord, &c.:
White Cotton, No. 3 1/2, \$1.50; No. 4,
\$2.00; No. 4 1/2, \$2.50; Colors, No. 3 1/2,
\$1.75; No. 4, \$2.25; No. 4 1/2, \$2.75;
Linen, No. 3 1/2, \$2.50; No. 4, \$3.50;
No. 4 1/2, \$4.50..... 20
Tent and Awning Lines: No. 5,
White Cotton, \$1.50; Drab Cotton,
\$1.50..... 20
Clothes Lines, White Cotton, 50 ft.,
\$2.75; 60 ft., \$3.25; 70 ft., \$3.75;
75 ft., \$4.00; 80 ft., \$4.25; 90 ft., \$4.75;
100 ft., \$5.25..... 20
Turner & Stanton Co.:
Solid Braided Chalk, Masons' and
Awning Lines..... 40
Clothes Lines, White Cotton..... 20
Shade Cord, Cotton or Linen..... 20

Locks—Cabinet—

Cabinet Locks..... 33 1/2

Door Locks, Latches, &c.—
NOTE—Net Prices are very often made
on these goods.
Reading Hardware Co..... 40
R. & E. Mfg. Co..... 10

Padlocks—

R. & E. Mfg. Co., Wrought Steel and
Brass..... 75¢10

Sash, &c.—

Ives' Patent:
Bronze and Brass, 55¢5%; Crescent,
60%; Iron, 60%; Window Ventil-
ating, 40¢20%; Robinson Pat. Ven-
ilating Sash Lock, 33 1/2.

Pullman Patent Ventilating Lock..... 35
Reading Sash Locks..... 40

Machines—Boring—

Com. Cpr't, without Augers..... \$2.00@2.25

Com. Ang'r, without Augers..... \$2.25@2.50

Swan's Improved..... 40¢10
Jennings, Nos. 1 and 1..... 25¢7 1/2
Jennings'..... 5 1/2
Snell's, Upright, \$2.65; Angular, \$2.90

Corking—

Reisinger Invincible Hand Power.....
1/2 doz. \$18.00

Fence—

Williams' Fence Machines..... each, \$5.50

Hoisting—

Moore's Anti-Friction Chain Hoist..... 30
Moore's Hand Hoist, with Lock
Hoist..... 20
Moore's Cyclone, High Speed Chain
Hoist..... 25

Ice Cutting—

Chandler's..... 12 1/2

Washing

Boss Washup Machine Co.: Per doz.
Boss No. 1..... \$27.00
Boss Rotary..... \$57.00
Champion Rotary Banner No. 1..... \$57.00
Standard Champion No. 1..... \$57.00
Standard Perfection..... \$57.00
Cincinnati Square Western..... \$57.00
Uneda American, Round..... \$57.00

Mallets—

Hickory..... 45¢50¢50
Lignumvitae..... 45¢50¢50

Timers' Hickory and Apple-wood

wood..... doz. 45¢50¢50

Mangers, Stable—

Swift Iron Works..... 50

Mats, Door—

Elastic Steel (W. G. Co.), new list..... 50
Keystone Wire Matting Co.:
Keystone..... 50
Ideal..... 50

Mattocks—

See Picks and Mattocks.

Milk Cans—See Cans, Milk.**Mills, Coffee, &c.—**

Enterprise Mfg. Co..... 20¢25
National Int. Jan. 1, 1902..... 30
Parker's Columbia and Victoria..... 30
Parker's Box and Side..... 30
Swift, Lane Bros. Co..... 30

Motors, Water—

Divine's Red Devil..... 30
Lippincott's..... 30

Mowers, Lawn—

NOTE—Set prices are generally quoted
cheap..... all sizes, \$1.80@2.00

Cheap..... all sizes, \$2.00@2.50
Better Grade, all sizes, \$2.50@4.50

High Grade..... \$4.50 4.75 5.00 5.25
Continental..... 60
Great American..... 70
Great American Ball B'g, new list..... 70
Quaker City..... 70
Pennsylvania, Jr., Ball Bearing..... 60
Pennsylvania, Jr., Ball Bearing..... 60
Pennsylvania Golf..... 50
Pennsylvania Horse..... 30
Pennsylvania Pony..... 40
Granite State..... 70
Style A, Low Wheel..... 70
Style B, Low Wheel..... 70
Style C, High Wheel, spl. disc..... 70
Style D, High Wheel, spl. disc..... 70

Philadelphia:
Style M, S. C. K. T..... 70
Style A, all Steel..... 60
Style B, High Wheel..... 60
Drexel and Gold Coin, special list..... 40
Horse..... 40
Pony..... 40
36-in. Horse..... 30
Eagle Horse..... 30
I. X. L. Horse..... 30

Nails—

Wire Nails and Brads, Miscel-
laneous..... 87 1/2 @ 87 1/2 @ 10¢
Cut and Wire. See Trade Report.

Hungarian, Finishing, Upholster-
ers' &c. See Tacks.

Horse—

Nos. 4 7 8 9 10
Anchor..... 23 20 19 18..... 40¢5
Colony..... 13 12 11 10..... net
New Haven..... 23 21 20 19..... 40¢5
Livingston..... 19 18 17 16 15..... 10
Western..... 19 18 17 16 15..... 10
Jobbers' Special Brands..... per lb. 9¢10¢

Picture—

Brass H'd..... 55 60 70 .. gro
Por. Head..... 1.10 1.10 1.10 .. gro

Nippers—

See Pliers and Nippers.

Nuts—

Gold Punched: Off list.
Square, Blank or Tapped..... 4.80¢
Hexagon, Blank or Tapped..... 5.10¢
Square, B'k, C. T. & R..... 5.10¢
Hexagon, B'k, C. T. & R..... 5.10¢
Hot Pressed:
Square, Blank..... 5.00¢
Hexagon, Blank..... 5.40¢
Square, Tapped..... 4.70¢
Hexagon, Tapped..... 5.10¢

Oil Tanks—See Tanks, Oil.**Oilers—**

Brass and Copper..... 50¢10
Tin or Steel..... 65¢10
Zinc..... 65¢10

Chase or Paragon—

Brass and Copper..... 50¢10
Tin or Steel..... 65¢10
Zinc..... 65¢10

Malleable, Hammers' Improved, Nos. 1, 2, 3, 50%.

American Tube & Stamping Co.:
Spring Bottom Cans..... 70¢10
Railroad Oilers, &c..... 60¢10

Openers—Can—Per doz.

Sprague, Iron Handle..... 30¢45¢
Sprague, Wood Handle..... 30¢45¢
Sardine Scissors..... \$1.75@3.00
Yankee Can and Bottle Opener.....
1/2 doz., net, \$0.75; Little Gem.....
1/2 doz., net..... \$0.65

Egg—

Hartigan Nickel Plate, 1/2 doz., \$2.00;
Silver Plate, \$1.00.

Packing—

Asbestos Packing, Wick and
Rope..... 20¢25¢

Rubber—

(Fair quality goods.)
Sheet, C. I..... 11¢12¢
Sheet, C. O. S..... 11¢12¢
Sheet, C. B. S..... 12¢13¢
Sheet, Pure Gum..... 10¢11¢
Sheet, Red..... 10¢11¢
Jenkins' '96, 1/2 lb. 8¢

Miscellaneous—

American Packing..... lb. 7¢10¢
Cotton Packing..... lb. 16¢25¢
Italian Packing..... lb. 9¢12 1/2¢
Jute..... lb. 4¢ 1/2¢
Russia Packing..... lb. 8¢11¢

Pails, Water, Well, &c.—

See Buckets.

Pans—Dripping—

Standard List..... 63¢7 1/2¢10¢
Edwards, Royal Blue..... 65¢7 1/2¢

Fry—

Common Lipped: 1 2 3 4 5
Nos. \$0.75 0.80 0.90 1.10 1.30
Refrigerator, Galva.....
Inch..... 12 14 16 18
Per doz..... \$1.75 2.25 2.80 3.15

Paper—Building Paper

Asbestos..... lb.
Roll Board or Building Felt,
6 to 30 lb., per 100 sq. ft. 3¢10¢5¢
Roll Board or Building Felt,
3-32 and 1/4 in., 45 to 60 lb.,
per 100 sq. ft..... 6¢
Mail Board, Sheet, 40 x 40 in.,
1-32 to 1/2 in..... 3¢10¢5¢

Rosin Sized Sheathing: 500 sq. ft.

Light weight, 25 lbs. to roll.....
40¢50¢
Medium weight, 30 lbs. to roll.....
50¢55¢
Heavy weight, 40 lbs. to roll.....
65¢70¢

Black Water Proof Sheathing,

500 sq. ft., 1 ply, 65¢; 2 ply,
85¢; 3 ply, \$1.10; 4 ply, \$1.25.
Deafening Felt, 9, 6 and 4 1/2 sq.
ft. to lb. ton..... \$50.00
Red Rope Roofing, 250 sq. ft.
per roll..... \$1.75

Tarred Paper—

1 ply (roll 400 sq. ft.), ton.....
\$14.00@18.00
2 ply, roll 108 sq. ft..... 68¢
3 ply, roll 108 sq. ft..... 98¢
Slater's Felt (roll 500 sq. ft.)..... 75¢

Sand and Emery—

Flint Paper and Cloth..... 50¢10¢
Garnet Paper and Cloth..... 25¢
Emery Paper and Cloth..... 50¢10¢60¢

Parers—Apple—

Goodell Co.:
Family Bay State..... 7 doz. \$15.00
Improved Bay State..... 7 doz. \$20.00
New Lightning..... 7 doz. \$7.00
Turn Table '98..... 7 doz. \$6.00
White Mountain..... 7 doz. \$5.00
Bonanza Improved..... each \$7.50
Dandy..... each \$10.00
Eureka Improved..... each \$20.00
New Century..... each \$20.00
Ranger..... each \$25.00

Livingston Nail Co.:

Daisy..... 1/2 doz. \$1.00
Little Star..... 1/2 doz. \$5.00
Rocking Table..... 1/2 doz. \$6.20

Reading Hardware Co.:

Advance..... 1/2 doz. \$1.00
Baldwin..... 1/2 doz. \$1.00
Reading 72..... 1/2 doz. \$3.25
Reading 78..... 1/2 doz. \$6.25

Potato—

Saratoga..... 1/2 doz. \$7.00
White Mountain..... 1/2 doz. \$6.00

P

Pinking Irons—

See Irons, Pinking.

Pins, Escutcheon—

Brass 50¢ @ 50¢ 10%
 Iron, list Nov. 11, '85... 60¢ @ 60¢ 10%

Pipe, Cast Iron Soil—

Standard, 2-6 in. 50%
 Extra Heavy, 2-6 in. 60%
 Fittings, Stand. and H'vy. 70%

Pipe, Merchant—

Consumers, Carloads.

Steel, Iron.

Blk. Galv. Blk. Galv.

	Blk. Galv.	Blk. Galv.
1/2 in. 10 ft.	58	59
1/2 in. 12 ft.	58	59
1/2 in. 14 ft.	58	59
1/2 in. 16 ft.	58	59
1/2 in. 18 ft.	58	59
1/2 in. 20 ft.	58	59
1/2 in. 22 ft.	58	59
1/2 in. 24 ft.	58	59
1/2 in. 26 ft.	58	59
1/2 in. 28 ft.	58	59
1/2 in. 30 ft.	58	59
1/2 in. 32 ft.	58	59
1/2 in. 34 ft.	58	59
1/2 in. 36 ft.	58	59
1/2 in. 38 ft.	58	59
1/2 in. 40 ft.	58	59
1/2 in. 42 ft.	58	59
1/2 in. 44 ft.	58	59
1/2 in. 46 ft.	58	59
1/2 in. 48 ft.	58	59
1/2 in. 50 ft.	58	59
1/2 in. 52 ft.	58	59
1/2 in. 54 ft.	58	59
1/2 in. 56 ft.	58	59
1/2 in. 58 ft.	58	59
1/2 in. 60 ft.	58	59
1/2 in. 62 ft.	58	59
1/2 in. 64 ft.	58	59
1/2 in. 66 ft.	58	59
1/2 in. 68 ft.	58	59
1/2 in. 70 ft.	58	59
1/2 in. 72 ft.	58	59
1/2 in. 74 ft.	58	59
1/2 in. 76 ft.	58	59
1/2 in. 78 ft.	58	59
1/2 in. 80 ft.	58	59
1/2 in. 82 ft.	58	59
1/2 in. 84 ft.	58	59
1/2 in. 86 ft.	58	59
1/2 in. 88 ft.	58	59
1/2 in. 90 ft.	58	59
1/2 in. 92 ft.	58	59
1/2 in. 94 ft.	58	59
1/2 in. 96 ft.	58	59
1/2 in. 98 ft.	58	59
1/2 in. 100 ft.	58	59

Pipe, Vitrified Sewer—

Carload lots.

Standard Pipe and Fittings, 3

to 24 in., f.o.b. factory:

First-class 82%

Second-class 82%

NOTE.—Market irregular.

Pipe, Stove—

	Per 100 joints.
Edwards' Nested: C. L. L. C. L.	
5 in. Standard Blue.....	\$7.25
6 in. Standard Blue.....	7.75
7 in. Standard Blue.....	8.25
8 in. Standard Blue.....	8.75
9 in. Standard Blue.....	9.25
10 in. Standard Blue.....	9.75
11 in. Standard Blue.....	10.25
12 in. Standard Blue.....	10.75
13 in. Standard Blue.....	11.25
14 in. Standard Blue.....	11.75
15 in. Standard Blue.....	12.25
16 in. Standard Blue.....	12.75
17 in. Standard Blue.....	13.25
18 in. Standard Blue.....	13.75
19 in. Standard Blue.....	14.25
20 in. Standard Blue.....	14.75
21 in. Standard Blue.....	15.25
22 in. Standard Blue.....	15.75
23 in. Standard Blue.....	16.25
24 in. Standard Blue.....	16.75
25 in. Standard Blue.....	17.25
26 in. Standard Blue.....	17.75
27 in. Standard Blue.....	18.25
28 in. Standard Blue.....	18.75
29 in. Standard Blue.....	19.25
30 in. Standard Blue.....	19.75
31 in. Standard Blue.....	20.25
32 in. Standard Blue.....	20.75
33 in. Standard Blue.....	21.25
34 in. Standard Blue.....	21.75
35 in. Standard Blue.....	22.25
36 in. Standard Blue.....	22.75
37 in. Standard Blue.....	23.25
38 in. Standard Blue.....	23.75
39 in. Standard Blue.....	24.25
40 in. Standard Blue.....	24.75
41 in. Standard Blue.....	25.25
42 in. Standard Blue.....	25.75
43 in. Standard Blue.....	26.25
44 in. Standard Blue.....	26.75
45 in. Standard Blue.....	27.25
46 in. Standard Blue.....	27.75
47 in. Standard Blue.....	28.25
48 in. Standard Blue.....	28.75
49 in. Standard Blue.....	29.25
50 in. Standard Blue.....	29.75
51 in. Standard Blue.....	30.25
52 in. Standard Blue.....	30.75
53 in. Standard Blue.....	31.25
54 in. Standard Blue.....	31.75
55 in. Standard Blue.....	32.25
56 in. Standard Blue.....	32.75
57 in. Standard Blue.....	33.25
58 in. Standard Blue.....	33.75
59 in. Standard Blue.....	34.25
60 in. Standard Blue.....	34.75
61 in. Standard Blue.....	35.25
62 in. Standard Blue.....	35.75
63 in. Standard Blue.....	36.25
64 in. Standard Blue.....	36.75
65 in. Standard Blue.....	37.25
66 in. Standard Blue.....	37.75
67 in. Standard Blue.....	38.25
68 in. Standard Blue.....	38.75
69 in. Standard Blue.....	39.25
70 in. Standard Blue.....	39.75
71 in. Standard Blue.....	40.25
72 in. Standard Blue.....	40.75
73 in. Standard Blue.....	41.25
74 in. Standard Blue.....	41.75
75 in. Standard Blue.....	42.25
76 in. Standard Blue.....	42.75
77 in. Standard Blue.....	43.25
78 in. Standard Blue.....	43.75
79 in. Standard Blue.....	44.25
80 in. Standard Blue.....	44.75
81 in. Standard Blue.....	45.25
82 in. Standard Blue.....	45.75
83 in. Standard Blue.....	46.25
84 in. Standard Blue.....	46.75
85 in. Standard Blue.....	47.25
86 in. Standard Blue.....	47.75
87 in. Standard Blue.....	48.25
88 in. Standard Blue.....	48.75
89 in. Standard Blue.....	49.25
90 in. Standard Blue.....	49.75
91 in. Standard Blue.....	50.25
92 in. Standard Blue.....	50.75
93 in. Standard Blue.....	51.25
94 in. Standard Blue.....	51.75
95 in. Standard Blue.....	52.25
96 in. Standard Blue.....	52.75
97 in. Standard Blue.....	53.25
98 in. Standard Blue.....	53.75
99 in. Standard Blue.....	54.25
100 in. Standard Blue.....	54.75

Planes and Plane Irons—

Wood Planes—

Bench, first qual. 30¢ @ 30¢ 10%
 Bench, second qual. 20¢ @ 20¢ 10%
 Molding 25¢ @ 25¢ 10%
 Chapin-Stephens Co.:
 Bench, First Quality..... 30%
 Bench, Second Quality..... 40%
 Molding and Miscellaneous..... 25%
 Toy and German..... 30%
 Union 60%

Iron Planes—

Chaplin's Iron Planes..... 50¢ @ 10%

Union 60%

Plane Irons—

Wood Bench Plane Irons, list
 Dec. 12, '06..... 25%
 Buck Bros..... 30%
 Chapin-Stephens Co..... 25%
 Union 60%
 L. & J. White..... 20¢ @ 20¢ 10%

Planters, Corn, Hand—

Kohler's Eclipse..... 1/2 doz. \$8.00

Plates—

Felloe 1/4 @ 4 1/4¢

Pliers and Nippers—

Button Pliers..... 75¢ @ 75¢ 10%
 Gas Burner, per doz., 5 in., \$1.25
 @ \$1.30; 6 in., \$1.45 @ \$1.50.
 Gas Pipe, 7 8 10 12 in.
 \$2.00 \$2.25 \$2.75 \$3.50

Acme Nippers..... 50¢ @ 50% 10%

Cronk & Carrier Mfg. Co.:
 American Button..... 60%
 Improved Button..... 75¢ @ 75% 10%
 Cronk's
 No. 80 Linemen..... 50%
 Stub's Pattern..... 45%
 Combination and others..... 33%
 Heller's Farriers' Nippers, Pliers
 and Tools..... 40¢ @ 40¢ 10%
 P. S. & W. Timmers' Cutting Nip-
 pers..... 60%
 Wm. Schellhorn Co.:
 Bernard, 35%; Elm City, 35%;
 Paragon, 50%; Lodi, 55%;
 Swedish side, End and Diagonal Cut-
 ting Pliers..... 50%
 Utica Drop Forge & Tool Co.:
 Pliers and Nippers, all kinds..... 40%
Plumbs and Levels—

Chapin-Stephens Co.:
 Plumbs and Levels..... 30¢ @ 30¢ 10%
 Chapin's Inn. Brass Cor. 40¢ @ 40% 10%
 Pocket Levels..... 30¢ @ 30¢ 10%
 Extension Sights..... 40¢ @ 40% 10%
 Marchants' Levels..... 40¢ @ 40% 10%
 Diston's Plumbs and Levels..... 60¢ @ 60% 10%
 Diston's Pocket Levels..... 60¢ @ 60% 10%
 Stanley's Duplex..... 30%
 Woods' Extension..... 33% 1/2

Polish—Metal, Etc—

Prestoline Liquid, No. 1 (1/4 qt.) 1/2
 doz., \$3.00; No. 2 (1 qt.) 1/2, 90¢
 Prestoline Paste..... 60%

Police Goods—

Tower's 25¢ @ 25¢ 10%

Polish—Metal, Etc—

Prestoline Liquid, No. 1 (1/4 qt.) 1/2
 doz., \$3.00; No. 2 (1 qt.) 1/2, 90¢
 Prestoline Paste..... 60%

George William Hoffman:
 U. S. Metal Polish Paste, 3 oz.
 boxes, 1/2 doz. \$0.50; 1/2 doz. \$1.50;
 1/2 lb boxes, 1/2 doz. \$1.25; 1 lb
 boxes, 1/2 doz. \$2.25.
 U. S. Liquid, 8 oz. cans, 1/2 doz.,
 \$1.25.
 Barkeepers' Friend Metal Polish, 1/2
 doz., \$1.75.

Stove—

Black Eagle Benzine Paste, 5 lb cans,
 1/2 lb 10¢
 Black Eagle, Liquid, 1/2 pt. cans,
 1/2 doz. 75¢
 Black Jack Paste, 1/2 lb cans, 1/2 doz. \$0.50
 Black Kid Paste, 5 lb cans, each, \$0.65
 Ladd's Black Beauty Liquid, per
 100 tins..... \$0.75
 Joseph Dixon's, 1/2 gr. \$0.75..... 10%
 Dixon's Plumbago..... 1/2 lb 8¢
 Fireside 1/2 gr. \$2.50
 Gem, 1/2 gr. \$1.50..... 10%
 Japanese 1/2 gr. \$3.50
 Jet Black 1/2 gr. \$3.50
 Peerless Iron Enamel, 10 oz. cans,
 1/2 doz. \$1.50

Poppers, Corn—

1 qt. Square, doz. \$0.88; gro. \$8.75
 1 qt. Round, doz. \$1.00; gro. \$10.00
 1 1/2 qt. Square, doz. \$1.10; gro. \$11.00
 2 qt. Square, doz. \$1.35; gro. \$13.50

**Post Hole and Tree Aug-
ers and Diggers—**

See also Diggers, Post Hole, &c.

Posts, Steel—

Steel Fence Post, each, 5 ft., 42¢;
 6 ft., 46¢; 6 1/2 ft., 48¢.
 Steel Hitching Posts..... each \$1.30

Potato Parers—

See Parers, Potato.

Pots, Glue—

Enamelled 35¢ @ 10%
 Tinned 40¢ @ 10%

Powder—

In Canisters:
 Duck, 1 lb..... each 45¢
 Fine Sporting, 1 lb..... each 75¢
 Rifle, 1/2 lb..... each 15¢
 Rifle, 1 lb..... each 25¢
 In Kegs:
 12 1/2 lb. kegs..... \$3.50
 25 lb. kegs..... \$4.50
 King's Semi-Smokeless:
 Keg (25 lb bulk)..... \$6.10
 Half Keg (12 1/2 lb bulk)..... \$3.00
 Quarter Keg (6 1/4 lb bulk)..... \$1.90
 Case 24 (1 lb cans bulk)..... \$8.50
 Half case (1 lb cans bulk)..... \$4.50
 King's Smokeless:
 Keg (25 lb bulk)..... \$12.00
 Half Keg (12 1/2 lb bulk)..... 6.25
 Quarter Keg (6 1/4 lb bulk)..... 3.25
 Case 24 (1 lb cans bulk)..... 14.00
 Half case 12 (1 lb c. bk.)..... 7.25

Presses—

Fruit and Jelly—

Enterprise Mfg. Co..... 20¢ @ 25%

Seal Presses—

Morrill's No. 1, 1/2 doz., \$20.00..... 50%

Pruning Hooks and Shears

See Shears.

Pullers, Nail—

Cyclops 50%
 Miller Falls, No. 3, 1/2 doz., \$12.00..... 33% @ 10%
 Morrill's No. 1, Nail Puller, 1/2 doz.,
 \$20.00..... 50%
 Pearson No. 1, Cyclops Spike Puller,
 each \$30.00..... 50%
 The Scranton Co. Case Lots:
 No. 24 (large)..... \$5.50
 No. 31 (small)..... \$5.00
 South & Hemenway Co.:
 Diamond B..... 70%
 Giant 50%
 Staple Pullers, Utica and Davi-
 son 60%

Pulleys, Single Wheel—

Inch 1 1/4 1 3/4 2 3
 Acme or Tackle,
 doz., \$0.30 .45 .60 1.05
 Hay Fork, Swivel or Solid Eye,
 doz., 4 in., \$1.25; 5 in., \$1.55
 Hot House, doz., \$0.65 .85 1.20
 Inch 1 1/4 1 3/4 2 3
 Screw, doz., \$0.16 .19 .23 .30
 Inch 1 1/4 1 3/4 2 3
 Side, doz., \$0.25 .40 .55 .60
 Inch 1 1/4 1 3/4 2 3

Sash Pulleys—

Common Frame; Square or
 Round End, per doz. 1 1/4 and
 2 in. 17¢ @ 20¢
 Amer. Mortise, no Face Plat.,
 per doz., 1 1/4 and 2 in. 20¢ @ 21¢
 Acme, No. 35, 1 1/4 in., 19¢; 2 in., 20¢
 Fox-All-Steel, Nos. 3 and 7, 2 in.
 Grand Rapids All Steel Nailpuller, 50%
 Niagara, No. 25, 1 1/4 in., 19¢; 2
 in., 20¢
 No. 26, 1 1/4 in., 19¢; 2 in., 20¢
 Star, No. 26, 1 1/4 in., 19¢; 2 in., 20¢
 Tackle Blocks—See Blocks.

Pumps—

Cistern 60%
 Pitcher 75¢ @ 75¢ 10%
 Wood Pumps, Tubing, &c..... 60%
 Barnes Dbl. Acting (low list)..... 60%
 Barnes Pitcher 75¢ @ 75%
 Contractors' Rubber Diaphragm No.
 1 & 2 60%
 Dairies Spray Pump..... 1/2 doz. \$6.50

Flint & Walling's Fast Mail Hand,
 (low list)..... 50%
 Flint & Walling's Fast Mail (low
 list)..... 50%
 Flint & Walling's Tight Top Pitcher..... 75% @ 10%
 National Specialty Mfg. Co., Measur-
 ing. Nos. 2, \$6.00; 3, \$5.50..... 30%
 Myers' Pumps (low list)..... 45%
 Myers' Power Pumps..... 45%
 Myers' Spray Pumps..... 45%

Pump Leathers—

Lower Valve Leathers—Per gro.:
 Inch..... 2 1/2 3 3 1/2 4
 \$3.10 3.70 4.35 4.95 5.00

Crimped Plunger Leathers—Per

100:
 Inch..... 2 1/2 3 3 1/2 4
 \$4.15 5.25 7.80 9.65

Punches—

Saddlers' or Drive, good..... doz. 50¢ @ 75¢

Spring, single tube, good qual-
 ity \$1.75

Revolving (4 tubes)..... doz. \$3.60

Remis & Co. East St. Drive, 50%
 Morrill's Nos. 1A, 1A, 1B, 1C,
 1D, \$15.00..... 50%
 Holmes, 1 die, each \$9.00..... 50%
 Niagara Hollow Punches..... 40%
 Wm. Schellhorn Co.:
 Belt and Ticket, Bernard, 35%;
 Paragon, 50%; Lodi..... 55%
 Timmers' Hollow, P. S. & W. Co. 40%
 Timmers' Solid, P. S. & W. Co. 40%
 doz., \$1.41..... 40%
Rail—Barn Door, &c.—

Sliding Door, Painted Iron..... 2 1/2 @ 2 1/2¢

Sliding Door, Wrought Brass..... 30%

Allth Mfg. Co.: Reliable Hanger
 Track..... 50%
Double Braced Steel Rail, 1/2 ft. 3 1/4¢
 O. N. T. Rail..... \$3.12Griffin's:
 xxx, 100 ft., 1 x 3-16 in., \$3.25;
 1/4 x 3-16 in., \$3.75;
 Hinged Hanger, 100 ft., 1 x 3-16
 in., \$3.50; 1/4 x 3-16 in., \$4.00.
 Lami:
 Hinged Track, 100 ft. \$3.45
 O. N. T., 100 ft., 1 in., \$3.00; 1 1/4
 in., \$3.45; 1 1/2 in., \$4.00.
 Standard, 1/4 in., 100 ft. \$1.00
 Lawrence Bros.:
 1 x 3-16 in., 100 ft., \$7.50; 1 1/4 x
 3-16 in., \$8.75..... 55¢ @ 75%
 M. C. Vetter:
 Hinged Hanger Track, 1/2 ft., 1 1/4¢
 1 x 3-16 Track..... 55¢ @ 75%
 Myers' Staying Track..... 60¢ @ 75%
 Richards' Mfg. Co.:
 Common, 1 x 3-6 in., \$3.00; 1 1/4 x
 3-16, \$3.25; 1 1/2 x 3-16, \$3.50.
 Special

Scythe Stones—

Pike Mfg. Co., 1901 list:	
Black Diamond S. S.	gro. \$12.00
Lamouille S. S.	gro. \$11.00
White Mountain S. S.	gro. \$9.00
Green Mountain S. S.	gro. \$8.00
Extra Indian Pond S. S.	gro. \$7.50
No. 1 Indian Pond S. S.	gro. \$7.00
No. 2 Indian Pond S. S.	gro. \$6.50
Leader Red End S. S.	gro. \$6.00
Quick Cut Emery	gro. \$10.00
Pure Corundum	gro. \$18.00
Crescent	\$7.00
Emery Scythe Rifles, 2 Coat . . .	\$8
Emery Scythe Rifles, 3 Coat . . .	\$10
Emery Scythe Rifles, 4 Coat . . .	\$12
Rainbow of 1904 list 3 1/2 in. . .	gro. \$13.50
Electro (Artificial)	3 1/2 in. \$12.00
Lightning (Artificial)	3 1/2 in. \$18.00
	3 1/2 in. \$33.75

Stoppers, Bottle—

Victor Bottle Stoppers	gro. \$9.00
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Stops—Bench—

Millers Falls	15&10%
Morrill's, No. 1, doz.	\$10.00
Morrill's, No. 2, doz.	\$12.50

Door—

Chapin-Stephens Co.	50@50&10%
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Plane—

Chapin-Stephens Co.	20%
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Straps—Box—

Cary's Universal, case lots . . .	2&10&10%
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Stretchers, Carpet—

Cast Iron, Steel Points, doz. . .	60@10&10%
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Socket	60@10&10%
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Excelsior Stretcher and Tack Hammer Combined, doz.	\$6.00
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Stuffers, Sausage—

Enterprise Mfg. Co.	25@5&7 1/2%
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National Specialty Co., list Jan. 1, 1902	10&5%
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P. S. & W. Co.	4&10&5%
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Sweepers, Carpet—

Bissell Carpet Sweeper Co.	doz. \$36.00
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Superba, Crotch Mahogany	\$36.00
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Triumph, Fancy Veneers	\$33.00
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Parlor Queen, Fig. Rosewood . . .	\$30.00
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Elite, Hungarian Ash	\$23.00
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Am. Queen, Fig. Mahogany	\$27.00
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Ideal, Bird's-Eye Maple	\$25.00
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Grand Rapids, Nickel	\$21.00
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Japan	\$22.00
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Standard, Nickel	\$22.00
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Crown Jewel, Nickel	\$21.00
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Crystal, Glass Top	\$36.00
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Grand, 17 in. wide	\$36.00
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Club, 24 in. wide	\$54.00
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Hall, 28 in. wide	\$60.00
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NOTE.—Rebates: 50c per dozen on three dozen lots; \$1 per dozen on five dozen lots; \$2 per dozen on ten dozen lots; \$2.50 per dozen on twenty-five dozen lots.

Tacks, Finishing Nails, &c.

American Carpet Tacks	90&25%
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American Out Tacks	90&25%
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Sveedes' Cut Tacks	90&25%
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Sveedes' Upholsterers'	90&35%
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Limpe Tacks	90&35%
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Gimp Tacks	90&35%
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Trimmers' Tacks	90&25%
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Looking Glass Tacks	65%
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Bill Posters' and Railroad Tacks .	90&40%
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Hungarian Nails	80&10%
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Finishing Nails	70%
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Trunk and Cloak Nails	80%
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NOTE.—The above prices are for Straight Weights.

Miscellaneous—

Double Painted Tacks	90&4 or 5 tens
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See also Nails, Wire.

Tanks, Oil and Gasoline—

Wilson & Friend Co.	Oil
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Gal. Gasoline	\$5.00
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30	\$2.75
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60	\$5.50
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120	\$11.00
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Tapes, Measuring—

American Asses' Skin	50@—%
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Patent Leather	25@30&5%
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Steel	33 1/2&6 1/2%
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Chesterman's	25@25&5%
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Keuffel & Esser Co.	
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Favorite, Ass Skin	40&10&50%
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Favorite, Duck and Leather . . .	25&50&25&10%
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Metalline and Steel, lower list .	35&5%; Pocket, 35@35&5%
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Lufkin's	
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Asses' Skin	40&10&50%
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Metalline	30@30&5%
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Patent Bend, Leather	25&50&25&10%
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Pocket	40@40&5%
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Steel	33 1/2&6 1/2%
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Wiebusch & Hilzer	
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Chesterman's Metalline, No. 341 .	25%
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Chesterman's Steel, No. 10081 . .	30%
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etc.	
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Teeth, Harrow—

Steel Harrow Teeth, plain or headed, 1/2-inch and larger . . .	per 100 lbs. \$2.75@3.00
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Thermometers—

Tin Case	80&10@80&10&5%
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Ties, Bale—Steel Wire—

Single Loop	80&10&5%
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Monitor, Cross Head, &c. 70&2 1/2%	
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Tinners' Shears, &c.—

See Shears, Tinners', &c.

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tire Benders, Upsetters, &c.

See Benders and Upsetters, Tire.

Tools—Coopers'—

L. & I. J. White	20@20&5%
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Haying—

Myers' Hay Tools	45%
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Miniature—

Smith & Hemenway Co.'s, David-son, 1/2 doz., Nickel Plated	\$1.50
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Gold Plated	\$2.00
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Saw—

Atkins' Cross Cut Saw Tools . . .	35&5%
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Simonds' Improved	37 1/2%
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Simonds' Crescent	38%
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Ship—

L. & I. J. White	25%
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Transom Lifters—

See Lifters, Transom.

Traps—Fly—

Balloon, Globe or Acme, doz. . .	\$1.15@1.25; gro. \$1.50@1.80
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Harper, Champion or Paragon . .	doz. \$1.25@1.40; gro. \$1.50@1.80
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Game—

Imitation Onocida	70&10%
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Arrowhouse	45&40&35%
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Hawley & Norton	65%
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Victor	70&10%
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Onocida Community Jump	50%
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Mouse and Rat—

Mouse, Wood, Choker, doz. holes .	12¢
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Mouse, Round or Square Wire . .	doz. 85¢@90¢
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Marty French Rat and Mouse Traps (Genuine)	
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No. 1, Rat, 1/2 doz.	\$13.25; case of 24 \$11.50 doz.
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No. 3, Rat, 1/2 doz.	\$6.50; case of 50 \$5.75 doz.
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No. 3 1/2, Rat, 1/2 doz.	\$5.25; case of 72 \$4.70 doz.
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No. 4, Mouse, 1/2 doz.	\$3.85; case of 150 \$3.00 doz.
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No. 5, Mouse, 1/2 doz.	\$3.00; case of 150 \$2.25 doz.
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Trowels—

Diston Brick and Pointing	25%
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Diston Plastering	20%
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Diston "Standard Brand" and Gard-ten Trowels	30%
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Kohler's Steel Garden Trowels, 1/2 doz. .	5 in., \$4.80; 6 in., \$6.00.
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Never-Break Steel Garden Trowels .	1/2 doz. \$6.00
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Woodrough & McParlin, Plastering .	25%
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Trucks, Warehouse, &c.—

B. & L. Block Co.	
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New York Pattern	50&10%
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Western Pattern	60&10%
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Handy Trucks	1/2 doz. \$16.00
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Grocery	\$15.00
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McKinney Trucks	each, net \$10.00
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Model Stove Trucks	1/2 doz. \$18.50
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Tubs, Wash—

Mfg'r's list, price per gross . . .	
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No. 0 1 2 3	
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Galvanized	\$67 \$79 \$89 \$99 10%
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Twine, Miscellaneous—

Flax Twine	
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No. 9, 1/4 and 1/2-lb. Balls 21@25¢	
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No. 12, 1/4 and 1/2-lb. Balls 21@22¢	
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No. 18, 1/4 and 1/2-lb. Balls 18@20¢	
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No. 24, 1/4 and 1/2-lb. Balls 17@19¢	
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No. 36, 1/4 and 1/2-lb. Balls 16@18¢	
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Chalk Line, Cotton	1/2 lb. 26@31¢
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Balls	26@31¢
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Cotton Mops, 6, 9, 12 and 15 lb. to doz.	11@19¢
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Cotton Wrapping, 5 Balls to lb. . .	according to quality . . . 15¢@23¢
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American 2-Ply Hemp, 1 1/2 and 1 1/2-lb. Balls	14¢@15¢
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American 3-Ply Hemp, 1-lb. Balls . .	15¢@16¢
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India 2-Ply Hemp, 1/4 and 1/2-lb. Balls (Spring Twine)	10¢@11¢
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India 3-Ply Hemp, 1-lb.	10¢@11¢
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India 3-Ply Hemp, 1 1/2-lb. Balls . .	10¢@11¢
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2, 3, 4 and 5-Ply Jute, 1-lb. Balls . .	13¢@14¢
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Mason Line, Linen, 1/2-lb. Balls . .	14¢@15¢
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No. 26 1/2 Mattress, 1/4 and 1/2-lb. Balls, according to quality . . .	30¢@60¢
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Wool, 3 to 6 ply	B 9¢; A 10¢
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Vises—

Solid Box	50@50&10%
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Parallel—

Atthol Machine Co.	
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Simpan's Adjustable	40%
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Standard	40%
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Amateur	40%
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Columbian Hdw. Co.	40%
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Fisher & Norris Double Screw, net each, Nos. 2, \$10.50; 3, \$16.00; 4, \$20.50; 5, \$27.00	
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Fulton Mach. & Vise Co.	
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Reed, Swivel	25%
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Star, Solid Jaw	40%
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Hollands	
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Kachinista	40¢@45%
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Keystone	65¢@70%
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Lewis Tool Co.	
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Adjustable Jaw	30%
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